DOCUMENT RESUME

ED 249 426 CG 017 745

AUTHOR	Siegel, Jacob S.; Davidson, Maria
TITLE	Demographic and Socioeconomic Aspects of Aging in the United States.
INSTITUTION	Bureau of the Census (DOC), Suitland, Md. Population Div.
SPONS AGENCY	National Inst. on Aging (DHHS/NIH), Bethesda, MD.
PUB DATE	Aug 84
NOTE	157p.; Tables are marginally legible due to small print.
AVAILABLE FROM	Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.
PUB TYPE	Information Analyses (070) -- Statistical Data (110)
JOURNAL CIT	Current Population Reports; Series P-23 n138
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Aging (Individuals); *Demography; Gerontology; *Health; *Older Adults; *Population Trends; Quality of Life; *Sociocultural Patterns; Socioeconomic Status
IDENTIFIERS	*Mortality Rates

ABSTRACT

This report (a substantial revision of a report issued in May, 1976 and reprinted in January, 1978) brings together and analyzes data on selected topics related to the demographic and socioeconomic aspects of aging, and the demographic and socioeconomic characteristics of the older population in the United States. The data come from the 1980 Census of Population, the Current Population Survey, the Census Bureau program of population estimates and projections, the vital statistics registration system, the National Health Survey, Social Security records, and other national data sources. The principal subjects treated are the numbers and proportions of older persons; age, sex, and race composition; geographic distribution and residential mobility; mortality, survival, and health; and various social and economic characteristics, including marital status and living arrangements, educational level, work status, and income. Mortality is considered in some detail both historically and prospectively since it is an important component of change in the size of the older population. The subject of health has been given separate and parallel treatment in this report, although fertility is given only a brief treatment. Numerous charts and tables supplement each subject area. (BL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED249426

CURRENT POPULATION REPORTS

Special Studies

Series P-23, No. 138

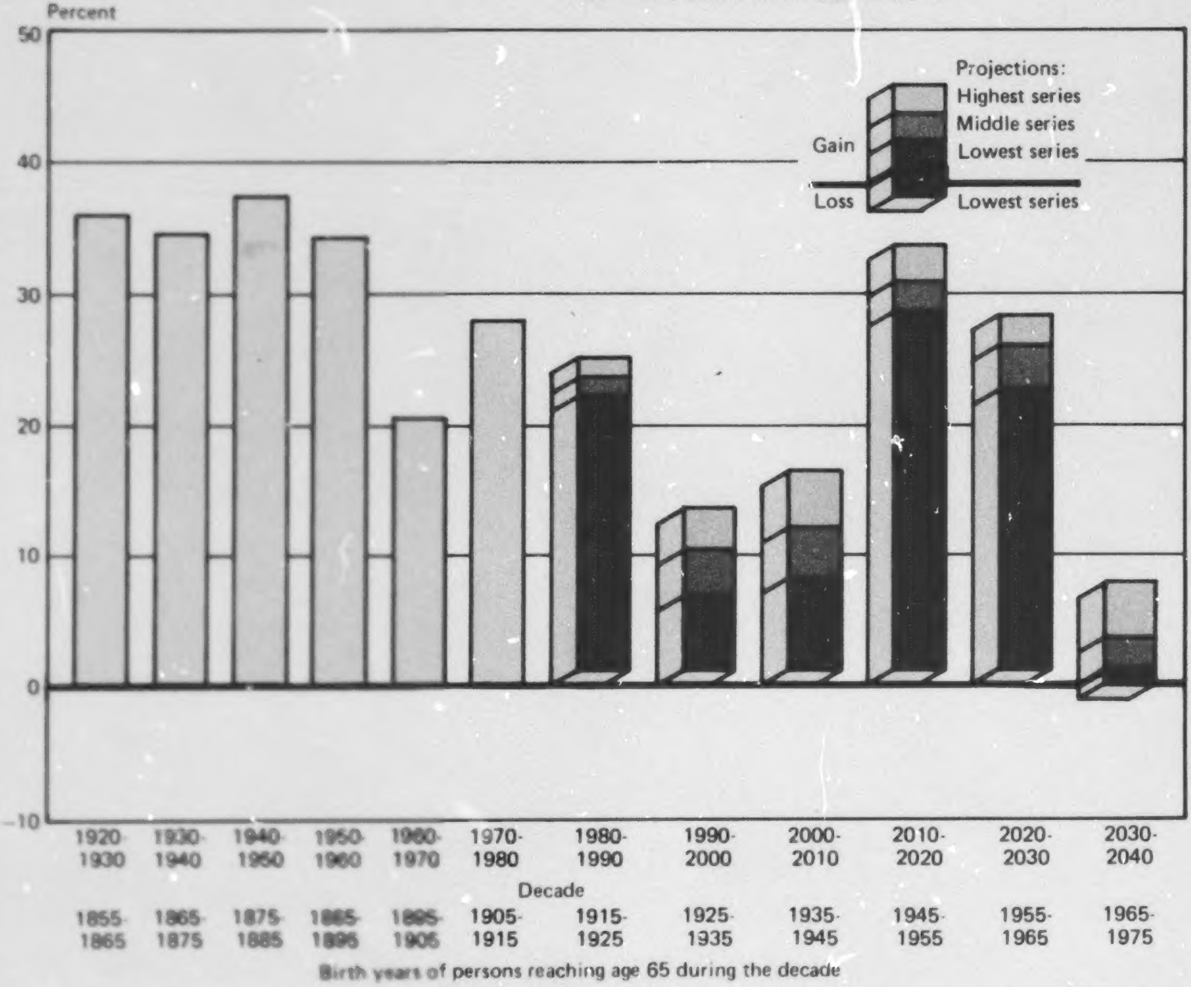
U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.

- Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

Demographic and Socioeconomic Aspects of Aging in the United States

Decennial Percent Increase of the Population 65 Years and Over: 1920 to 2040



Source: Table 2-1 and Current Population Reports, Series P-23, No. 59.

CG 017745

U.S. Department of Commerce
BUREAU OF THE CENSUS

CURRENT POPULATION REPORTS

Special Studies

Series P-23, No. 138
Issued August 1984

Demographic and Socioeconomic Aspects of Aging in the United States

by
Jacob S. Siegel
and
Maria Davidson

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

- Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

CG 017745

U.S. Department of Commerce
Malcolm Baldrige, Secretary
Clarence J. Brown, Deputy Secretary
Sidney Jones, Under Secretary for
Economic Affairs

BUREAU OF THE CENSUS
John G. Keane,
Director

BUREAU OF THE CENSUS
John G. Keane, Director
C.L. Kincannon, Deputy Director
William P. Butz, Associate Director
for Demographic Fields

POPULATION DIVISION
Roger A. Herriot, Chief

ACKNOWLEDGMENTS

This report was prepared with the help of **Ann E. Anderson** who provided professional assistance at an earlier stage of the work. **Gregory Spencer** made available and interpreted the new population projections of the Census Bureau and collaborated with **Jerome M. Glynn** in preparing the special series of projections assuming no mortality. **Prithwis Das Gupta** prepared the special life tables eliminating various causes of death for 1978, and **J. Gregory Robinson** collaborated with the authors in preparing the estimates of interstate migration of the elderly. **Tecora Jimason, Thelma D. McConkey, Frances Lee Garner, Gary D. Smith, Katherine Campbell,** and **Bonnie Opalko** assisted in carrying out the calculations at various stages. Grateful acknowledgment is made to **Mary J. Kisner,** who typed various drafts of the report and provided other valuable support with the assistance of **Thelma McConkey, Rheta D. Pemberton, Maxine Staples,** and **Donna Butler.** This report could not have been produced without the dedicated services of several members of the Publications Planning and Graphics Branch, Publication Services Division, Census Bureau. Their contribution, particularly that of **Patricia Heiston,** is acknowledged also.

Work on this report was in part supported by the National Institute on Aging, National Institutes of Health, under a reimbursable agreement between the Census Bureau and the Institute. The cooperation of **Dr. Jacob A. Brody,** Associate Director, Epidemiology, Demography, and Biometry Program, **Clifford Patrick,** former Chief, Demography Program, and **Dwight Brock,** Chief, Biometry Program, National Institute on Aging, is particularly acknowledged.

Grateful acknowledgment is also made to the many staff members in other Federal agencies who provided information and data, sometimes in advance of publication. The principal agencies represented are the Bureau of the Labor Statistics, the Social Security Administration, and the Health Care and Financing Administration.

SUGGESTED CITATION

U.S. Bureau of the Census, Current Population Reports, Series P-23, No. 138, *Demographic and Socioeconomic Aspects of Aging in the United States,* U.S. Government Printing Office, Washington, D.C., 1984.

For sale by the Superintendent of Documents, Washington, D.C. 20402.

Preface

This report brings together and analyzes data on selected topics related to the demographic and socioeconomic aspects of aging and the demographic and socioeconomic characteristics of the older population in the United States. The data come from the 1980 Census of Population, the Current Population Survey, the Census Bureau program of population estimates and projections, the vital statistics registration system, the National Health Survey, Social Security records, and other national data sources. The principal subjects treated are the numbers and proportions of older persons; age, sex, and race composition; geographic distribution and residential mobility; mortality, survival, and health; and various social and economic characteristics, including marital status and living arrangements, educational level, work status, and income.

Mortality is considered in some detail both historically and prospectively since it is an important component of change in the size of the older population. The subject of health has been given separate and parallel treatment in this report, along with the other principal topics, partly because it is relevant to an in-depth analysis of mortality and partly because health may be viewed as an important social charateristic of the population. It is of considerable interest to gerontologists and of growing interest to demographers.

Fertility is given only a brief treatment, however, in spite of its important role in determining the numbers and share of older persons in the population. A considerable amount of literature is available on the trends in fertility and the factors affecting them but to date this material has not been of particular interest to gerontologists and gerontological practitioners. The aging of the "baby-boom" cohorts may stimulate such interest.

Additional data on the socioeconomic characteristics of the older population in consolidated form are presented in the Census Bureau report, *Social and Economic Characteristics of the Older Population: 1978*, Current Population Reports, Series P-23, No.65. Similar data on the middle-aged population are presented in the report, *Social and Economic Characteristics of Americans at Mid-Life*, Current Population Reports, Series P-23, No. 111. The present report supersedes an earlier publication, *Demographic Aspects of Aging and the Older Population in the United States*, Current Population Reports, Series P-23, No. 59, first issued by the Bureau of the Census in May 1976 and reprinted in January 1978.

The present report represents a substantial revision of the previous report. The data on all subjects have been updated where possible. The material on the socioeconomic characteristics of the elderly population has been amplified. More recent population projections have been included. New material has been added on the measurement of population aging, health conditions, utilization of health care services, intergenerational family support, retirement, and noncash benefits. New estimates of the interstate migration of the elderly are presented. The bibliography has been brought up to date and extended.

April 1, 1983

Contents

Preface III

Chapter 1. Introduction 1
- Concepts of aging 1
- Definition of the older population 1
- Aging of population vs. aging of individuals 1
- Period analysis vs. cohort analysis 2
- Sources and accuracy of the data 2

Chapter 2. Size and Age Structure 5
- Numbers of older persons 5
- Net and gross changes 7
- Proportion of older persons 9
- Measurement of population aging 13

Chapter 3. Sex, Race, and Ethnic Composition 19
- Sex composition 19
- Race composition 20
- Ethnic composition 23

Chapter 4. Geographic Distribution and Residential Mobility 31
- Divisions, States, and counties 31
- Patterns of residential mobility 33
- Size of place and type of residence 34
- Gerontic enclaves 34
- Summary note on migration 35

Chapter 5. Mortality and Survival 43
- Quantity vs. quality of life 43
- Trends in life expectancy and age-specific death rates 43
- Causes of death 50
- Geographic variations 52
- Prospects for mortality reduction 53
- Some theoretical considerations 57

Chapter 6. Health 73
- Introduction 73
- Acute conditions and injuries 73
- Chronic conditions 73
- Trends in morbidity 74
- Sex differences 74
- Race differences 75
- Work disability 75
- Utilization of health care services 76

Chapter 7. Social Characteristics 85
- Marital status and marriage 85
- Living arrangements 87
- Intergenerational family support 89
- Educational attainment 91
- Literacy 92

Chapter 8. Economic Characteristics 101
Labor force participation 101
Money income and noncash benefits 106
Assets 110
Expenditures 112
Societal age and economic dependency 112
Demographic and other factors in social security funding 114

CHARTS

Figure

2-1. Decennial percent increase of the population 65 years and over: 1920 to 2040 6
2-2. Percent of the total population in the older ages: 1920 to 2040 8
3-1. Sex ratios in the older ages: 1920 to 2020 20
3-2. Percent of the total population 65 years and over, by sex and by race: 1920 to 2020 21
4-1. Percentage of the total population 65 years and over, for States: 1980 32
4-2. Mobility and migration status for the population 65 years and over and 4 years and over in 1979: 1975-79 33
5-1. Average remaining lifetime at birth, age 65, age 75, and age 80: 1929-31, 1939-41, 1954, 1968, 1980 45
5-2. Death rates for the population 55 years old and over, by age: 1950 to 1980 46
5-3. Percent surviving to each exact age of an initial cohort of White female births, according to various life tables for the United States: 1890 to 1978 47
7-1. Distribution of the male and female populations 65 years old and over by marital status: 1981 85
7-2. Distribution of the male and female populations 65 years old and over by living arrangements: 1981 87
8-1. Ratio of median income for families with householders 65 years and over to median income for all families: 1960 to 1980 105
8-2. Mean assets of retirement history study respondents and percent distribution of mean assets by type of assets, by marital status and sex: 1975, 1971, and 1969 111

DETAILED TABLES

Size and Age Structure

2-1. Total population in the older ages and decennial increases: 1950 to 2040 15
2-2. Decennial percent increase of the population for broad age groups: 1950 to 2020 15
2-3. Illustrative estimates of the contribution of births and deaths to change in the population 60 to 69 years of age: 1950 to 2010 16
2-4. Estimates of the demographic components of change in the population 65 years and over: 1970-80, 1960-70, and 1950-60 16
2-5. Percent of the total population in the older ages: 1950 to 2020 17
2-6. Percent distribution of the population 65 years and over by age: 1950 to 2020 17
2-7. Projections of the percentage of the total population 65 years and over according to middle fertility, middle immigration and alternative assumptions of mortality: 1990 to 2050 17
2-8. Projections of the percentage of the total population 65 years and over according to middle mortality, middle immigration, and alternative assumptions of fertility: 1990 to 2050 18
2-9. Comparison of various measures of the aging of the population: 1920 to 2020 18
2-10. Age at which average years of remaining life equals 10 or 15 and the percentage of total population above this age: 1920 to 1980 18

Sex, Race, and Ethnic Composition

3-1. Sex ratios of the population for broad age groups, by race: 1950 to 2020 25
3-2. Decennial percent increase of the population in the older ages, by sex and, by race: 1950 to 2020 26

3-3. Percent of the total population in the older ages, by sex and, by race: 1950 to 2020 27
3-4. Age at which average years of remaining life equals 10 and the percentage of total population above this age, by sex and race: 1920 to 1980 28
3-5. Estimates of the demographic components of change in the population 65 years and over, by sex and race: 1970-80 and 1960-70 28
3-6. Percent of the population in the older ages, for specified ancestry groups: 1979 29
3-7. Percent distribution of the total population and the population 45 years and over by nativity and parentage, and percent of the native and foreign-born populations in the older ages: 1979 and 1970 29
3-8. Percent of the foreign-born population in the older ages, for specified countries of birth: 1970 30
3-9. Ability to speak English for persons 65 years and over and for persons of all ages who speak a language other than English at home: 1979 30

Geographic Distribution and Residential Mobility

4-1. Change in the total population 65 years and over, 1970-80 and 1960-70, in the Black and Hispanic populations 65 and over, 1970-80, and in the population 75 and over, 1970-80, for regions, divisions, and States 36
4-2. Percent 65 years and over for all classes in 1980, 1970, and 1960, for Blacks and Hispanics in 1980 and 1970, and percent 75 years and over, 1980 and 1970, for regions, divisions, and States 37
4-3. Estimates of the components of change in the population 65 years and over, for regions, divisions, and States: 1970-80 38
4-4. Estimated net migration of the population cohort 65 years and over at mid-decade, for regions, divisions, and States: 1970-80 and 1960-70 39
4-5. Distribution of the population 65 years and over and 4 years and over in 1979, by mobility status for 1975-79, by sex 39
4-6. Mobility rates and migration rates, by age: 1975-79, 1975-76, 1965-66, and 1955-56 40
4-7. Distribution of the White, Black, and Hispanic populations 65 years and over by urban and rural residence and size of place, and percent 65 years and over of total population: 1970 40
4-8. Distribution of the White, Black, and Hispanic populations 65 years and over by metropolitan residence and size of metropolitan area, and percent 65 years and over of total population: 1980, 1975, and 1970 41

Mortality and Survival

5-1. Average remaining lifetime at various ages, by sex and race: 1900 to 1978 59
5-2. Average years lived in interval and proportion surviving, for various age intervals, by sex and race: 1900 to 1978 60
5-3. Death rates for the population 55 years and over, by age: 1940 to 1980 61
5-4. Ratios of male to female death rates for the population 55 years and over, by age and race: 1900-02 to 1980 61
5-5. Ratios of Black and other races to White death rates for the population 55 years and over, by age and sex: 1900-02 to 1980 62
5-6. Death rates for the ten leading causes of death for the population 55 years and over, by age: 1978 62
5-7. Ratios of male to female death rates for the ten leading causes of death for the population 65 years and over, by age: 1978 63
5-8. Ratios of Black and other races to White death rates for the ten leading causes of death for the population 65 years and over, by age: 1978 63
5-9. Death rates for the ten leading causes of death for males and females 55 years and over, by age, 1978, and percent change, 1968-78 and 1954-68 64
5-10. Gain in expectation of life at birth and at age 65, in years, due to elimination of various causes of death, by sex and race: 1978 and 1969-71 65
5-11. Probability at birth and at age 65 of eventually dying from various causes, by sex and race: 1978 and 1969-71 65

5-12. Variation in life expectation at birth and at age 65, by sex and race, for States: 1969-71 and 1959-61 66
5-13. Life expectation at birth and at age 65, by sex, for regions, divisions, and States: 1969-71 67
5-14. Life expectation at birth and at age 65, by race, for regions, divisions, and States: 1969-71 68
5-15. Death rates for the population 60 years and over of various countries, by sex and age: various years from 1976 to 1978 69
5-16. Recent and projected values for life expectancy at birth and at age 65, for the United States, 1976 to 2050, and best-country composite, 1976 69
5-17. Life expectation at birth and at age 65, by sex, for various countries: various years from 1970 to 1978 70
5-18. Comparison of actual values for average remaining lifetime and average years lived in interval with values projected by the Social Security Administration: 1977-78 70
5-19. Projections of life expectation at birth and at age 65, by sex, prepared by the Social Security Administration: November 1981 71

Health

6-1. Selected health indicators for the total population, the population under 65 years of age, and the population 65 years and over, by sex: 1978 80
6-2. Incidence rates for acute conditions, for the total population, the population under 45 years, and the population 45 years and over, by sex: 1980 80
6-3. Percent of the population with activity limitations and percent of persons with limitations who are limited by selected chronic conditions, for broad age groups: 1979 and 1969-70 81
6-4. Percent distribution of the total population, the population under 65 years of age, and the population 65 years and over by limitations of mobility due to chronic conditions, by sex: 1972 81
6-5. Physician and dentist visits per person, by sex and by broad age groups: 1970 to 1980 82
6-6. Admission rates and average length of stay in short-term hospitals, for the total population and the population 65 years and over: 1960 to 1979 82
6-7. Hospital utilization rates for the population in broad age groups, by sex: 1980 82
6-8. Residence in nursing and personal-care homes, by race and by sex, for the total population, and by sex and age for persons 65 years and over: 1964 to 1977 83
6-9. Per capita personal health-care expenditures for persons 65 years and over: selected years, 1965 to 1978 83
6-10. Percent distribution of the population by selected personal habits and life style: various years, 1975 to 1979 84

Social Characteristics

7-1. Distribution of the population 15 years and over by marital status, by broad age groups and sex: 1981 93
7-2. Distribution of the population 55 years and over by marital status, by age and sex: 1960 to 1995 94
7-3. Living arrangements of the population 55 years and over, by age and sex: 1965 to 1981 95
7-4. Comparison of male and female death rates for married persons 55 years and over, by age: 1959-61 95
7-5. Percent distribution of the population 65 years and over by family status, by sex: 1965 to 1981 96
7-6. Percent distribution of households by type, for householders 65 years and over, by age groups: 1970 to 1995 96
7-7. Mean age at which selected critical life events occurred for ever-married White mothers born in 1900-49, and ever-married White mothers born in 1900-49 who have married once and who have completed high school, by birth cohort: June 1975 96
7-8. Measures of the marital life cycle of men and women, for selected birth cohorts: 1908-12 to 1938-42 97

7-9. Familial aged dependency ratios with one elderly generation: 1930 to 2030 97
7-10. Relative survival of women from parenthood to old age and of newborn children to middle age, according to life tables for 1929-31 to 1978 98
7-11. Familial aged dependency ratios with two elderly generations: 1930 to 2030 98
7-12. Educational attainment of the population 65 years and over and 25 years and over, by sex: 1959 to 2000 99
7-13. Percent literate for persons 65 years and over and 14 years and over, by race and, by nativity and parentage: 1979 99

Economic Characteristics

8-1. Labor force participation ratios, for the population 55 years and over, by age, race, and sex: 1955 to 2000 116
8-2. Estimated and projected number of persons in the labor force 55 years and over, by sex and broad age groups: 1981, 1990, and 2000 117
8-3. Percentage of insured workers 62 years and over with OASDI benefits in current-payment status, by age group and sex: selected years, 1965 to 1981 117
8-4. Median income of families with householders 65 years and over, by type of family and race of householder, and of unrelated individuals 65 years and over, by race and sex: 1950 to 1980 118
8-5. Income per person based on median income of families, for all families and families with householders 65 years and over, by type of family and race of householder: 1960 to 1980 119
8-6. Income distribution of "elderly" families according to work status of householder: 1980 120
8-7. Family status and race of persons 65 years and over below the poverty level: 1959 to 1981 120
8-8. Family householders and unrelated individuals 65 years and over below the poverty level, by race and sex: 1981 120
8-9. Percent distribution by source of income, and median income, for families with householders 65 years and over and all families, and for unrelated individuals 65 years and over and all unrelated individuals: 1980 121
8-10. Percent distribution of households, for householders 65 years and over and all ages, by total money income, according to various income growth rates and household projections: 1977, 1985, 1990, and 1995 122
8-11. Percentage of households with elderly householders receiving specified noncash benefits: 1979 123
8-12. Proportion of Retirement History Study respondents reporting on assets, and mean assets, by type of assets, marital status, and sex: 1975, 1971, and 1969 123
8-13. Percent distribution of annual expenditures by budget item, for all families and families by age of householder: 1972-73 124
8-14. Societal aged dependency ratios: 1920 to 2040 124

APPENDIXES

Appendix A. Sources of Data on the Older Population

Program sources 125
Publication sources, or guides to sources, of Census Bureau data 126

Appendix B. Quality of Data on the Older Population

Population statistics 129
Death and health statistics 134

Appendix C. Methodology for Estimates of Net Migration of the Elderly for States

Two concepts of net migration for ages 139
Net migration for age group 65 and over, 1970-80 139
Net migration for the cohort 65 and over in 1965, 1960-70, and for the cohort 65 and over in 1975, 1970-80 140

Appendix D. Derivation of Estimated Proportion of Elderly Persons with a Surviving Child 141

Appendix E. Methodology of National Demographic Projections

Population by age, sex, and race 143
Households and marital status 144
Educational attainment 145
Labor force 145
Money income distribution of households 146

APPENDIX TABLES

B-1. Estimated percents of net census error for the population 55 years and over, by age, sex, and race: 1980 and 1970 130
B-2. Comparison of percents of net census error based on aggregate Medicare data and percents of gross omission based on the Census-Medicare match study, for the population 65 years and over, by sex and race: 1970 130
B-3. Estimates of the percents of total net error of the weighted CPS figures prior to the adjustment to the independent population estimates, for the population 65 years and over and 14 years and over, by sex and race: monthly averages, 1976 133
B-4. Percent differently reported and percent net difference between deaths during May-August 1960, by age as stated in the 1960 census record and as stated on the death certificate, by race, sex, and specified age interval 134
B-5. Comparison of death rates based on registration data and death rates based on Medicare data for the population 65 years and over, by age, 1978, and by age and race, 1976 136
E-1. Current estimates and ultimate fertility and mortality assumptions and annual net immigration assumptions employed in the principal series of population projections 143

Selected Bibliography 147

Note on table titles and rounding

The titles of tables in this report representing percent distributions distinguish, in effect, the principal variable from the secondary variables. The principal variable is the variable for which the component categories are presented in the table in percents totaling 100 percent. The secondary variables are those variables for which separate percent distributions of the principal variable are presented. The principal variable is mentioned in the title before the secondary variables and is separated from them by the word "by." For example, in the phrase "percent distribution by marital status, by sex", marital status is the principal variable and sex is the secondary variable; the phrase means that the table presents the marital distributions of males and of females. Cross-tabulated variables are accompanied by a single "by" (e.g., "by sex and race"), and individual variables (not cross-tabulated) are each accompanied by "by" (e.g., "by sex and by race").

Figures in percent distributions have usually been separately rounded from figures computed to additional digits. Since the percents have not been adjusted for rounding, they do not necessarily add to 100.0.

Chapter 1.
Introduction

CONCEPTS OF AGING

Aging marks the inexorable running out of the biological time clock for the individual, given the limited life span of possibly 100 years for the human species. Although the aging process goes on steadily throughout life, the term most commonly refers to the changes in later life, following the reproductive age period. Aging proceeds at different rates for different individuals if we define it in physiological, psychological, behavioral, or sociological terms rather than chronological terms. Physiologists will look for signs of aging in the loss of functional efficiency of various bodily organs. Psychologists will look for signs of aging in the decline in neuromuscular skills, learning ability, judgement, memory, and sensory acuity. Behavioral scientists and sociologists will look for signs of aging in the individual's disengagement from social roles and growing inability to live independently. For some, the signs of physiological deterioration or the ability not to function independently come earlier than for others, but they inevitably appear for all as time passes.

Demographically, aging is defined essentially in terms of chronological age. A demographic approach can be justified on the assumption that, for large populations, the aging process, functional age, and physiological age follow chronological age closely. It avoids the problem of fixing the "onset" of aging in the individual case, a task faced by the biological and behavorial sciences and beset with grave difficulties. Moreover, the demographic approach can take advantage of statistical tabulations made from censuses and population surveys for conventional age groups.

DEFINITION OF THE OLDER POPULATION

A discussion of the demographic aspects of aging could be concerned with how the numbers, composition, and characteristics of the population vary with age over the whole age range. The present report does deal with such age variation to some extent, but it focuses on the older ages, namely those over 55 and particularly those over ages 60, 65, and 75. At these ages the impact of aging in the form of changes in the individual's physical condition (e.g., survival, health) and social and economic characteristics (e.g., labor force participation, income, living arrangements) is most pronounced and of special public concern. These individual changes are collectively reflected in the data on the demographic and socioeconomic characteristics of the population.

Since the older ("herontic") population is not a single homogeneous mass and its characteristics tend to vary sharply with age within the band 55 and over, or even 65 and over, it is desirable in any analysis of the older population to consider the group in terms of component age groups. In this report, we distinguish at times the older population (55 and over or 60 and over), the elderly (65 and over), the aged (75 and over), and the extreme aged (85 and over). Other ages and age bands have special significance and are referred to in the report. For example, 62 is the age of eligibility for reduced Social Security benefits. The age group 80 and over has often been used by gerontologists to identify the "frail elderly" (or, more appropriately, the frail aged) on the ground that a substantial share of persons in this age band are dependent on others for their care.

For convenience and simplicity in the discussion, as well as its general appropriateness as a definition of the older population, however, the single broad group 65 years old and over is often selected in this report for detailed consideration. The attainment of age 65 marks the point of retirement for many workers and the age of qualification for full Social Security benefits and for "Medicare" coverage and figures in several other important pieces of legislation affecting the older population, including Federal and State tax laws. After age 65, the level of many characteristics of the population changes very rapidly (e.g., sex composition, morbidity rates, work participation, living arrangements) and hence differs greatly from that for the ages just below. The characteristics of the broad group 65 years and over or 65 to 74 years are sometimes compared in the report with those of persons 55 to 64, 60 to 64, or 60 and over. The age band 60 and over has a special importance in aging studies because this group is separately identified to receive various benefits under the Older Americans Act.

AGING OF POPULATION VS. AGING OF INDIVIDUALS

It is useful and important to distinguish between the aging of individuals and the aging of populations. Demographers are interested in both aspects of aging. Their interest in the former focuses on the aggregate experience of individuals in various population groups with respect to aging (i.e., survival and longevity). This experience is reflected in such measures as life expectancy at birth, life expectancy at age 65, the probability of survival from one age to another, person-years lived in an age interval, and total life expectation. Aging of this kind is a function purely of changes in death rates.

The aging of a population refers to the fact that a population, as a unit of observation, is "getting older" or "getting younger." Population aging may be measured variously in terms of the median age, the mean age, the proportion of persons 65 years old and over, the ratio of persons 65 and over to children under 15, the proportion of the population above the age corresponding to some stated life expectancy, say 10 or 15 years, or some other summary measure of age structure (e.g., the slope of a regression line fitted to the age distribution). The various measures of aging may indicate different degrees or even directions of aging for the same population during a particular period. A population may be described as "aging" and "younging" at the same time if, as may occur, the proportion of elderly persons and the proportion of children are both increasing. The aging of populations is a function of changes in their mortality, fertility, and migration rates, particularly fertility rates.

PERIOD ANALYSIS VS. COHORT ANALYSIS

In the study of aging and the older population, we are often concerned with the relationship of age to the variation of some demographic or socioeconomic event (e.g., migration) or characteristic (e.g., marital status). One may get a misleading impression as to this relationship by merely examining the variation by age in the relative frequency of the event or characteristic in a particular year. To deal with these problems, demographers also compile their data in terms of birth cohorts, that is, groups born in the same years who are followed analytically with respect to some event or characteristic (e.g., marital status) over a number of years as the members grow older. The latter type of analysis is called *cohort analysis,* as contrasted with the type of analysis based on a single year (or a few years), which is called *period or cross-sectional analysis.*

Cohort analysis deals with the evolution of a type of demographic or socioeconomic event or characteristics over the lifetime of a cohort on the basis of data for the actual years through which the cohort lives. Hence, cohort analysis reflects the age variation in demographic events or characteristics more realistically than period analysis. The use of cohort analysis is also based on the hypothesis that the demographic events in individuals' lives are influenced by their previous demographic experience.[1] Cohort analysis also avoids certain impossible results or gross distortions of interpretation which could occur with period analysis (e.g., that educational attainment declines with age or that 1,000 women can have more than 1,000 first marriages in their lifetime). It has however, the disadvantages that the experience of the cohort has no clear time reference, that a large number of years have to pass before a record of lifetime experience can be established, and that this experience is influenced at different stages in the life cycle by different historical events.

In period or cross-sectional analysis, data for only one year (or a few years) are employed to describe the changes over the life cycle. If an analysis of the lifetime evolution of an event or characteristic is carried out on this basis, then the analysis produces a measure for a hypothetical or synthetic cohort. Such a synthetic cohort consists of data from a large number of real cohorts. All of the cohorts represented are influenced in common by the sociocultural, environmental, and historical events of the year in question. The influence of some external events, such as an economic depression, tends to be pervasive over the age span even though these events do not affect all the ages equally, and the reports necessarily vary with the previous cohort experience of each age group.

One may view the pattern of variation with respect to age of a demographic or socioeconomic event or characteristic in a particular year as the joint product of three general factors or components: the general (cohort) pattern of the age cycle of a particular event or characteristic for a given population at a given era (age cycle effect), the changing historical-sociocultural conditions to which the various cohorts involved are exposed as they move through the age cycle (period effect), and the properties of the specific birth cohorts under consideration (cohort effect). The first refers to the general succession of events characterizing the life course as the members of a cohort grow older (e.g., the rise, leveling off, and decline of labor force participation of men). The historical conditions include the level of technology, the state of the economy, social norms, etc. The last factor refers particularly to such properties of a cohort as its relative size and structure; large cohorts tend to have very different experiences from small cohorts, for example.

Various efforts have been made to disentangle age cycle, period, and cohort effects in age data for a particular demographic phenomenon or to measure the variation imposed on the general age cycle by period and cohort effects. The disentangling of period and cohort effects can be facilitated by time series analysis for individual age groups, period analysis for a series of years, and comparative analysis of several birth cohorts.

SOURCES AND ACCURACY OF THE DATA

For the most part, the present study employs official statistics. They come principally from the following sources: Decennial censuses; The program of (nonsurvey) population estimates and projections carried out by the U.S. Bureau of the Census; the Current Population Survey, a continuing national sample survey conducted by the U.S. Bureau of the Census; the National Health Survey, especially the Health Interview Survey, conducted by the U.S. Bureau of the Census under the sponsorship of the National Center for Health Statistics, U.S. Public Health Service; the national vital statistics registration system; and life tables prepared by the National Center for Health Statistics, U.S. Public Health Service. In addition, more limited use has been made of the statistics of Medicare enrollment and death rates from the Social Security (Medicare) data system, and of data from the Social Security Retirement History Study. These and other sources are identified as appropriate in the text of the report.

---

[1] See, for example, Norman B. Ryder, "The Cohort as a Concept in the Study of Social Change," *American Sociological Review,* Vol. 30, No. 6, December, 1965, pp. 843-861, and Merwyn Susser, "Demography of Aging—Discussant's Perspective," pp. 83-96 in Adrian M. Ostfeld and Don C. Gibson (eds.) *Epidemiology of Aging, Summary Report and Selected Papers of the Conference on the Epidemiology of Aging, Elkridge, Maryland, June 11-13, 1972.* National Institute of Child Health and Human Development, National Institutes of Health.

In general, the figures for the older ages are subject to a substantial degree of error. For some categories of information, the degree of error may be much greater than for the younger ages. The figures are affected not only by the failure to count everyone or to register all vital events and migratory movements but also by the misreporting of age and other characteristics. The (nonsurvey) population estimates and projections, which are derived by the methods of demographic accounting and demographic analysis, are subject to errors of the measurement model (that is, the general methodological design and the assumptions), in addition to the errors of coverage, response, and processing of the census data and the other data (e.g., birth statistics, death statistics, immigration data) employed in their preparation. The census data, the population estimates and projections, and the death statistics have not been adjusted for coverage errors or errors in reporting. Since these limitations apply to both the population figures and the figures on deaths, they apply also to the death rates and the life table values, although the errors may offset one another wholly or partly.

In addition to coverage, response, and processing errors, the estimates based on the Current Population Survey are subject to sampling error. Like the independent population estimates to which the "raw" survey estimates are adjusted, the survey estimates are at a level consistent with the census counts in total and for age, sex, and race categories; specifically they do not contain adjustments for census net undercounts in these or other categories. Further information regarding the derivation of the Current Population Survey estimates and the quality of the data from the Current Population Survey is given in appendix B of this report and in the original sources cited.

In spite of the stated limitations of the reported data on the older population, it is believed that the general magnitudes, relations, and patterns are reflected satisfactorily by the reported figures, except perhaps for the figures at the very extreme ages. In any case, small differences should be disregarded or at least viewed with caution.

Chapter 2.
Size and Age Structure

NUMBERS OF OLDER PERSONS

The correct population of the United States is large and continues to grow rapidly. There were 35.8 million persons over age 60, 25.7 million over 65, 16.9 million over 70, 10.1 million over 75, and 2.3 million over 85 in 1980 (table 2-1). The latest population projections indicate that the numbers in all of these age categories will be substantially or considerably larger by the end of this century and will continue to grow at least for the first three decades of the next century.

This report employs the latest population projections issued by the U.S. Census Bureau.[2] These projections are based on current population estimates for July 1, 1981, which were carried forward to future dates by use of a cohort-component method and assumptions regarding future fertility, mortality, and net immigration. In addition to a middle series of population projections, the Census Bureau developed a highest series and a lowest series on the basis of alternative assumptions of fertility, mortality, and net immigration. The highest and lowest series were designed to provide an approximation of a range of uncertainty in the middle series.[3] The basic assumptions underlying the three series of population projections are as follows:

Series	Fertility: Ultimate lifetime births per woman	Mortality: Life expectancy in 2050	Net immigration: Annual net immigration
Middle.	1.9	79.6	450,000
Highest	2.3	83.3	750,000
Lowest	1.6	76.7	250,000

Appendix E gives a more detailed description of the assumptions employed in developing the population projections.

The population 60 years and over numbered 18.5 million in 1950. By 1980, the group had nearly doubled in size to 35.8 million. In the year 2000, we may expect about 45½ million persons in these ages, or about one-quarter more than in 1980 (middle series). The decennial growth rate for the population 60 and over approximated 29 percent between 1950 and 1960, but then it began a generally declining trend which is expected to bring the rate down to about 7 percent in the decade 1990-2000. Decennial growth rates in subsequent decades will continue to fluctuate greatly, attaining 29 percent in 2010-20 and falling to only 1 percent in 2030-40.

The population 65 and over numbered 12.4 million in 1950. By 1980, the group had more than doubled in size to 25.7 million. The figure for the 65-and-over population in 1980 exceeded the 1970 figure by 5.6 million, a 10-year increase corresponding to an annual average gain of 562,000 persons. According to the Census Bureau projections, the number will grow in the coming decade at about the same "rate," 609,000 per year. By the year 2000, we may expect about 35 million persons 65 and over, or one-third more than at present. Continuous substantial increases are expected to bring the figure to 64 million in 2030, or 2¼ times the 1980 figure. The alternative highest and lowest population projections for 2030, designed to provide a confidence range around the middle population projections, are 73 million and 57 million.

The population 65 and over increased rapidly during the 1970-80 period (28 percent), much more rapidly than the population as a whole (11 percent). (See table 2-1, table 2-2, and figure 2-1). It was not the fastest growing age group in the 1970's, however; this was the group 25 to 34 years of age, the group representing the first wave of the "baby boom." The younger group increased by 47 percent between 1970 and 1980 (table 2-2). The population 65 and over also showed a substantial percentage increase during the 1960's (21 percent), when the total population grew only 11 percent and the baby boom group, 15 to 24 years of age, grew 48 percent. The growth rate of the elderly population during the 1960's and 1970's was well below its growth rate during the 1950's (35 percent) and the preceding decades (35 to 37 percent for 1920 to 1950).

According to the Census Bureau middle projections, the population 65 and over will show an increase during the 1980's, 24 percent, somewhat similar to the increase in the previous two decades. We can then expect a sharp drop in the amount and rate of increase of the population 65 and over, lasting about two decades (10 percent for 1990 to 2000 and 12 percent for 2000 to 2010). In the following decade (2010 to 2020) the number of persons

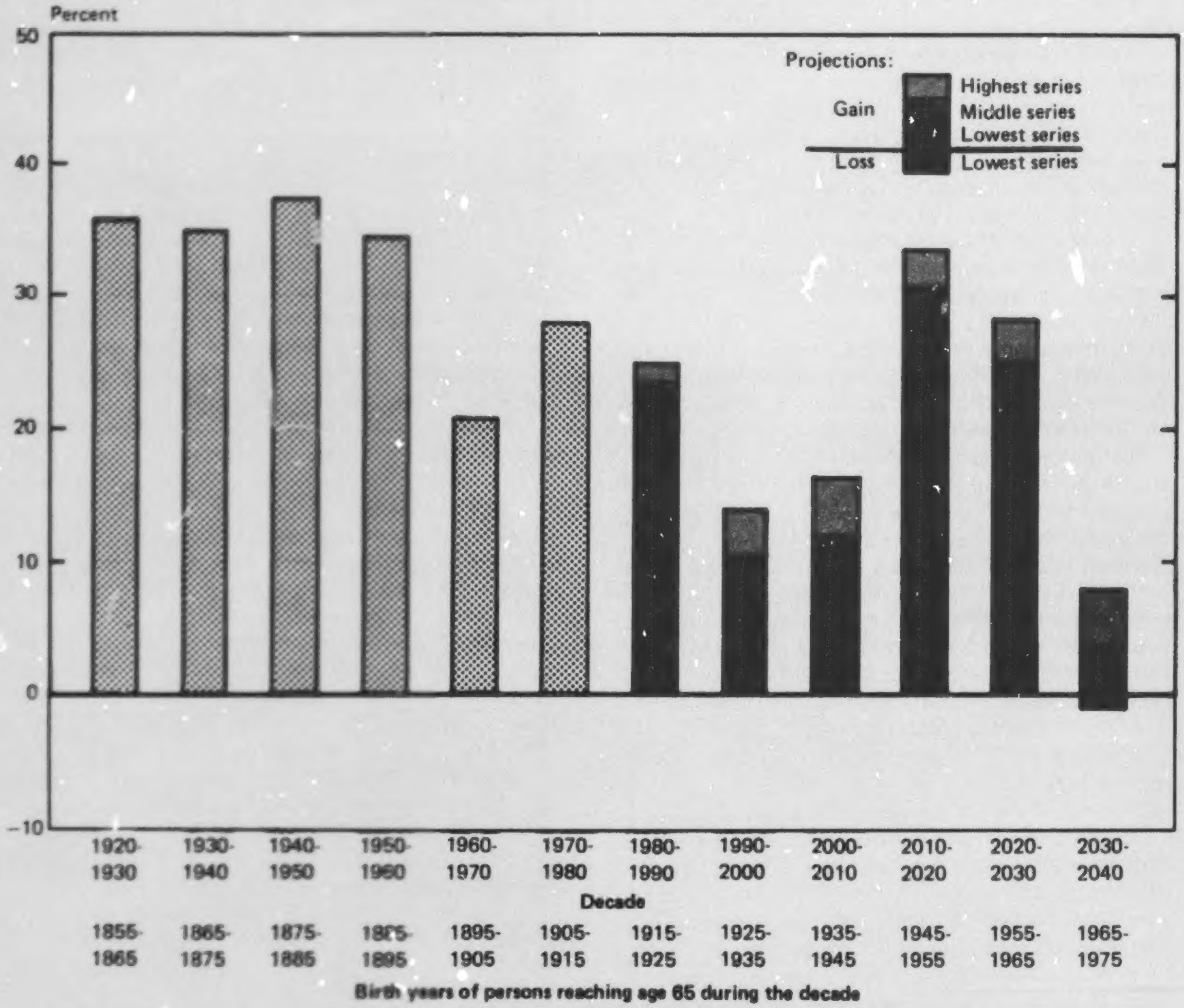
---

[2] U.S. Bureau of the Census, *Preliminary Projections of the Population of the United States: 1982 to 2050*, Current Population Reports, Series P-25, No. 922, November 1982, and corresponding unpublished tabulations.

[3] It is not possible to state precisely the probability associated with the uncertainty range given, but the figures may be considered roughly as delimiting a 75-90 percent confidence interval.

FIGURE 2-1.

Decennial Percent Increase of the Population 65 Years and Over: 1920 to 2040



Source: Table 2-1 and Current Population Reports, Series P-23, No. 59.

65 and over is expected to leap forward by over 12 million, or 31 percent. The growth rate should continue at a similarly high level between 2020 and 2030. The elderly population as a whole never grows as rapidly as the 10-year age group carrying the first wave of the baby-boom cohorts, however.

The population 75 years and over and the population 85 years and over will show fluctuations in decennial growth rates similar to those in the population 65 years and over but with a lag of 10 and 20 years, respectively. Accordingly, the population 75 and over will grow very rapidly between 2020 and 2040, and the population 85 and over will advance sharply between 2030 and 2050, after a decade or two of slower growth. Some 30 million persons are expected to be 75 or over in 2030, a half century from now. In that year, even before the baby boom cohorts arrive, the 85-and-over group will number nearly 9 million. By 2040, after the first wave of the baby boom cohorts arrive, a decennial increase of nearly 50 percent will occur and the 85-and-over group will number nearly 13 million.

Role of demographic factors. The changes in the population 65 years and over principally reflect increases in the number of births 65 to 84 years or so before the particular reference date. As the number of births shifts, the rate of growth of the elderly population 65 years later tends to shift in corresponding manner. The general rise in the number of births in the 19th century and in the first few decades of this century largely accounts for the past and prospective rapid increases in the number of elderly persons up to about 1985. (The rise in the number of births was occurring even while the birth rate was falling because of the rapid increase in the size of the population.)

Of particular interest is the impact of the shift in the trend of births since World War I. The sharp drop in the increase in the population 65 years and over after about 1990 will result from the rapid decline in the number of births during the 1920-30 and 1930-40 decades. The births of the postwar baby boom, 1945-64, will then have their impact on the size of the elderly population. As the first of the larger birth cohorts attains age 65 after about 2010, the number of elderly persons will rise sharply. The direct effect of the baby boom will run for about 20 years to 2030. Thereafter, the growth rate of the elderly will begin a sharp decline as the smaller birth cohorts of the late 1960's and the 1970's reach age 65. As a result of the steady deflation in the size of these birth cohorts, the number of persons 65 years and over may decline slightly between 2030 and 2040, as is shown by the lowest series of projections.

The projected numbers of elderly persons cited here should be close to the mark because they are unaffected by future fertility. The people who will be over age 65 in the year 2000 or even the year 2040 are now all living. Their size is determined by the current size of the cohort (which is essentially known), future mortality, and future net immigration. While the future changes in the base population have to be predicted, this is quite different from predicting the entire population, including the fertility component. Moreover, fertility tends to fluctuate widely, and, hence, cannot be predicted closely.

Mortality and immigration, particularly the former, have an important effect on the size of the older population also. Deaths reduce the size of the initial cohort of births, of course, and net immigration typically increases it. Mortality rates have fallen rather regularly through most years of this century and, as a result, the initial cohorts of births have been reduced by smaller and smaller proportions, with the passage of time, before attaining age 65 or ages 65 to 84. During the first half of this century, from about 25 to 45 percent of the births survived to ages 65 to 84 according to the U.S. life tables of 1900-02 and 1949-51. The corresponding figure was 54 percent according to the U.S. life table for 1978. The middle series of mortality projections for 2050 implies that about 68 percent of the births survive to ages 65 to 84.

The past general decline in death rates has contributed to the increase in the number of aged persons, but its effect on the increases has generally been much less than the rise in the number of births. Deaths number far less than births, are distributed over all the ages of the life span, and have been subject to less fluctuation in this century than births. Hence, the potential role of fertility in changes in the size of the elderly population over particular periods of time far exceeds the potential role of mortality. In fact, changes in the number of births have had a demonstrably greater effect on changes in the number of elderly than changes in death rates in the last century. Some illustrative data on the relative contribution of births and deaths to the change in the population 60 to 69 years of age for 1950 to 2010 are shown in table 2-3.[4] The relative change in the survival rates (last col.) may be compared with the percent change in births (col. 5). The absolute shifts in the percent increases of the population and of births from decade to decade are virtually identical (cols. 3 and 6).

We expect death rates to continue to decline, albeit less rapidly than in the last decade and a half. There is the possibility, however, of marked future reductions in death rates at the older ages. Such a trend could mean a somewhat larger elderly population and greater increases than are shown by the Census Bureau's middle series of population projections. For example, the projection of the population 65 years and over would be larger by about 1.4 million or 3.9 percent for the year 2000 and by 5.0 million or 10 percent for the year 2020 in the low series of mortality projections than in the middle series. Age-specific death rates decline between 1980-81 and 2050 at a rate 50 percent faster in the low series of mortality projections than in the middle series. On the other hand, if the high series of mortality projections prevails, there would be 1.2 million or 3.4 percent fewer persons 65 years old or over in the year 2000, and 3.9 million or 7.6 percent fewer in 2020, than if the middle series prevails. Age-specific death rates decline between 1980-81 and 2050 at a rate one-half as rapidly in the high series as in the middle series.

Whether immigration contributes to the growth of the older population depends on the fluctuations in the volume of immigration. These have sometimes resulted in an acceleration of population growth rates for the elderly and at other times in a deceleration. The large and increasing volume of immigration prior to World War I, particularly of youth, contributed greatly to the increase in the number of persons 65 years and over up to about 1960. Because of the general falling-off of immigration since World War I, however, this factor has been much less important in the growth of the elderly population since 1960 (even having a negative effect on changes in growth rates) and is expected to play a minor role in the future. For example, the medium allowance for net immigration adds only 2.0 million persons, or 4.1 percent, to the middle series of projections of the population 65 years and over in 2020.

NET AND GROSS CHANGES

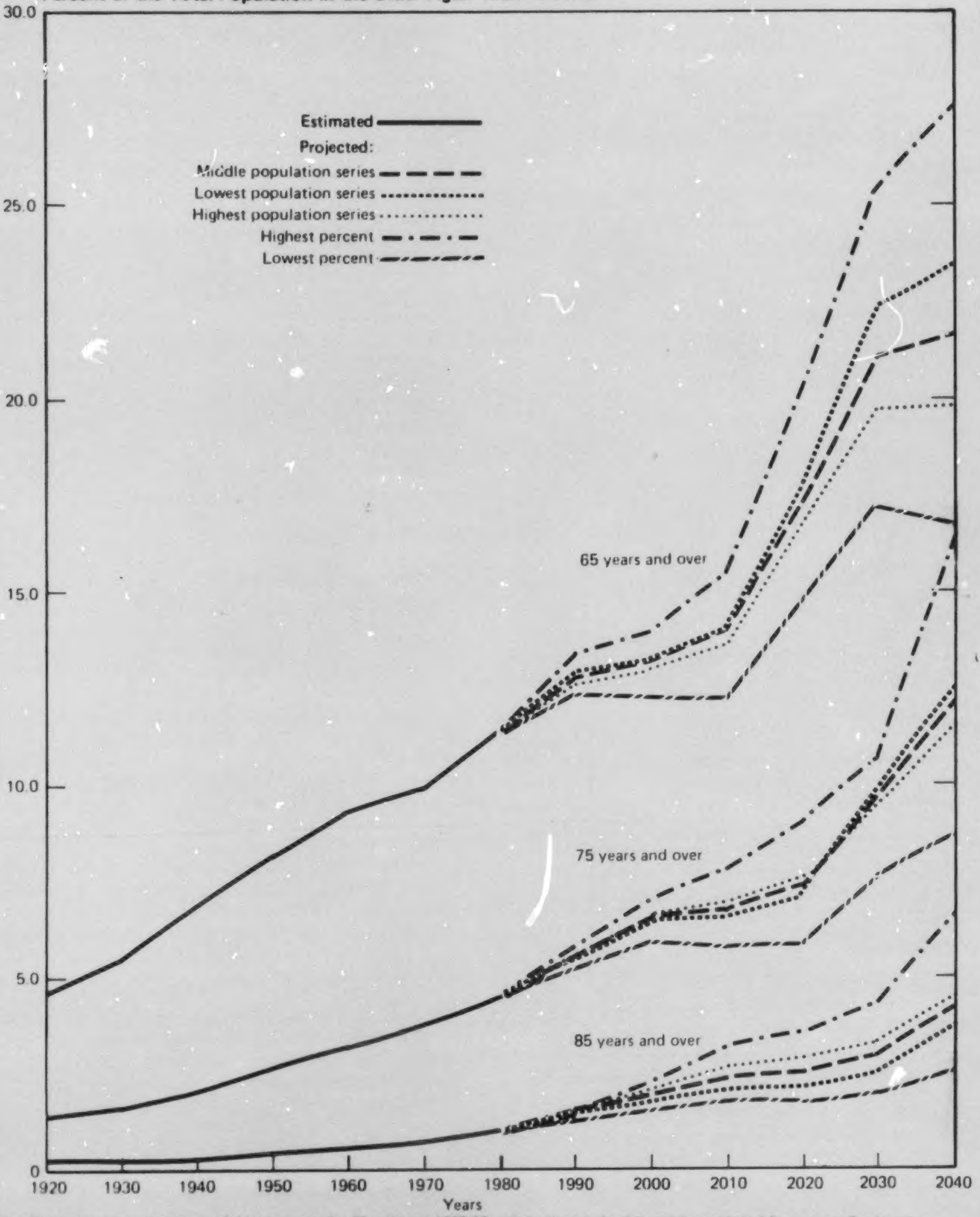
Because of the relatively high death rates of the older population, membership in the group is, on the average, relatively short in duration, and the identity of the members changes rapidly over relatively short periods of time in spite of its broad age span. "Population turnover" in this group may be measured in several ways. Consider the period of a decade. Most simply, we may examine the percentage of the total population 65 years and over at the end of the decade falling in the 65-to-74-year group,

---

[4] See also U.S. Department of State, *U.S. National Report on Aging for the U.N. World Assembly on Aging*, June 1982, esp. table 1, p. 13.

FIGURE 2-2.

Percent of the Total Population in the Older Ages: 1920 to 2040



Note: Estimates and projections as of July 1, except for 85 and over, 1920-30, which relate to April 1; points are plotted for years ending in zero.

Source: Table 2-5, text p. 17, and unpublished records.

that is, the proportion of the total elderly population who are surviving new entrants. Of the population 65 years and over in 1980, for example, 65 percent will have joined the group after 1970 (table 2-4).

We may also examine estimates of the components of change in the elderly population during the decade in relation to the initial size of the population. The rate of gross gain during the decade 1970-80 was 89 percent. The rate of gross gain is defined here as the number of persons reaching age 65 during the decade (17.9 million for 1970-80) plus the number of (net) immigrants (less than 0.1 million) expressed as a percentage of the initial population 65 years and over (20.1 million). The rate of gross loss—the number of deaths 65 years and over during the decade (13.4 million) expressed as a percent of the initial population 65 years and over—was 62 percent. The difference between the gross gain rate and the gross loss rate, 27 percent, is the rate of net gain.

About 50 percent of the initial population cohort 65 years and over (i.e., persons age 65 or over in 1970) died during the 1970-80 decade. In addition, the new arrivals in the group (i.e., persons reaching age 65 during the decade) sustained a loss of 13 percent by 1980. The resulting average gross loss rate for the initial population and the new arrivals combined is 33 percent.

A more sensitive measure of the turnover of the elderly population is given by the growth effectiveness ratio, the ratio of (a) the net gain in the population 65 years and over to (b) the gross change in this age group (i.e., the sum of the components of change without regard to sign). The lower the ratio, the greater the turnover and the less efficient the demographic changes. For the 1970-80 decade this ratio was 0.18; that is, there was a net addition to the population 65 years and over of only 18 persons for every 100 demographic events affecting that age group (additions through aging and net immigration, and losses through deaths).

During the course of the decade 1960-70, the rate of gross gain (87 percent) and the rate of gross loss (66 percent) of the population 65 years and over were, respectively, slightly lower and somewhat higher than the same measures for the 1970-80 period. Accordingly, the rate of net gain for 1960-70 (21 percent) was much lower than for 1970-80 (27 percent). In particular, the 10-year mortality rate for the initial population aged 65 and over in 1960 (53 percent) and the mortality rate for the population reaching age 65 during the 1960-70 decade (16 percent) were somewhat higher than during the following decade. During the 1970-80 period, however, the number of persons reaching age 65 (17.9 million) and the number of deaths (12.4 million) were substantially higher than during 1960-70 decade (14.4 million and 11.0 million, respectively). These increases offset one another only in part, and as a result the net gain, both in absolute and relative terms, was substantially greater in the more recent decade than in the earlier one.

PROPORTION OF OLDER PERSONS

Proportion 65 and over. The population 65 years and over has been growing steadily and rapidly as a share of the total U.S. population (table 2-5 and figure 2-2). The percentage of the population 65 years and over as recorded at decennial intervals from 1920 to 1980 and as projected to 2050 is as follows:

Year (July 1)	Percent	Year (July 1)	Percent in population series		
			Middle[1]	Highest[2]	Lowest[3]
Estimates:		Projections:			
1920	4.6	1990	12.7	12.6	12.8
1930	5.4	2000	13.1	13.0	13.1
1940	6.8	2010	13.9	13.7	13.9
1950	8.1	2020	17.3	16.7	17.8
1960	9.3	2030	21.1	19.7	22.4
1970	9.9	2040	21.6	19.8	23.4
1980	11.3	2050	21.7	19.4	24.0

[1] Middle fertility, middle mortality, and middle immigration.
[2] High fertility, low mortality, and high immigration.
[3] Low fertility, high mortality, and low immigration.

Source: U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 922, *op. cit.*, and corresponding unpublished tabulations.

The proportion grew more than 3 percentage points between 1950 and 1980, from 8.1 percent in 1950 to 11.3 percent in 1980. It should continue rising steadily at least to the year 2030, if not to the middle of the century and beyond. According to the middle population series, the proportion will rise to 13.1 percent in 2000 and 13.9 percent in 2010 and then will jump upward to about 21.1 percent in 2030. Alternatively, it may rise more slowly to only 19.7 percent in 2030, as in the highest population series, or more rapidly to 22.4 percent, as in the lowest population series. The actual amount of the rise in the proportion 65 years and over may fluctuate greatly, as in the past, but barring a marked upward shift in fertility, such as is not now envisaged, the proportion will maintain an upward course.

We believe that the range defined by the percents 65 years and over corresponding to the highest population series and the lowest population series understates the uncertainty to be associated with the middle series. The combination of fertility, mortality, and immigration producing a maximum range in the total population (high fertility-low mortality-high immigration and low fertility-high mortality-low immigration) tends to produce an artificially narrow range in the proportion of elderly persons. In each series, the effect of mortality tends to offset the effect of fertility on the proportion 65 years and over. The lowest proportions 65 years and over can be obtained by combining the assumptions of high fertility, high mortality, and high immigration, and the highest proportions can be obtained by combining the assumptions of low fertility, low mortality, and low immigration. The lowest and highest proportions for 1990 to 2050, shown in juxtaposition to the corresponding figures from the middle series, are as follows:

Year (July 1)	Lowest percent[1]	Middle percent[2]	Highest percent[3]
1990	12.4	12.7	13.0
2000	12.2	13.1	13.9
2010	12.3	13.9	15.5
2020	14.7	17.3	20.1
2030	17.2	21.1	25.5
2040	16.5	21.6	27.6
2050	15.6	21.7	29.3

[1] High fertility, high mortality, and high immigration.
[2] Middle fertility, middle mortality, and middle immigration.
[3] Low fertility, low mortality, and low immigration.
Source: U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 922, *op. cit.*, and corresponding unpublished tabulations.

The range defined by the lowest and highest percents is believed to overstate the uncertainty to be associated with the middle series, but they may provide a more realistic range for the middle series than the first figures offered. These series are probably more useful for applications of the data that focus on the proportion of the elderly (e.g., funding of Social Security) than the series that maximize or minimize the size of the total population. The effective range of uncertainty is best represented by percents intermediate to these identified above as defining the range, e.g., between 17.2 percent and 19.7 percent on the low side and between 22.4 percent and 25.5 percent on the high side, for the year 2030 (figure 2-2).

Proportion 75 and over. A rise in the proportion of the total population in the 75-and-over age group between now and the middle of the next century is even more likely than for the 65-and-over group, as the following figures suggest:

Year (July 1)	Percent
Estimates:	
1920	1.4
1930	1.6
1940	1.4
1950	2.6
1960	3.1
1970	3.7
1980	4.4

Year (July 1)	Percent in population series		
	Middle[1]	Highest[2]	Lowest[3]
Projections:			
1990	5.5	5.5	5.5
2000	6.5	6.5	6.4
2010	6.7	6.9	6.5
2020	7.3	7.4	7.1
2030	9.8	9.6	9.9
2040	12.2	11.6	12.5
2050	12.0	11.4	12.4

[1] Middle fertility, middle mortality, and middle immigration.
[2] High fertility, low mortality, and high immigration.
[3] Low fertility, high mortality, and low immigration.
Source: U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 922, *op. cit.*, and corresponding unpublished tabulations.

The proportion is expected to rise steadily from 4.4 percent in 1980 to 9.8 percent in 2030 and to 12.2 percent in 2040. This implies a near trebling of the proportion by the later year. Even the slower growth of the proportion in the highest population series results in a near trebling.

As suggested earlier, the range of uncertainty in the projected proportion 75 years and over may not be adequately represented by the figures shown above. Projections of the minimal and maximal proportions, based on other combinations of assumptions of fertility, mortality, and immigration, for 1990 to 2050, are as follows:

Year (July 1)	Lowest percent[1]	Middle percent[2]	Highest percent[3]
1990	5.3	5.5	5.6
2000	5.9	6.5	7.0
2010	5.7	6.7	7.8
2020	5.8	7.3	9.0
2030	7.5	9.8	12.6
2040	8.7	12.2	16.5
2050	7.9	12.0	17.6

[1] High fertility, high mortality, and high immigration.

[2] Middle fertility, middle mortality, and middle immigration.

[3] Low fertility, low mortality, and low immigration.

Source: U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 922, *op. cit.*, and corresponding unpublished calculations.

Proportion in the older ages under zero population growth. The population of the United States would move toward and attain zero growth (ZPG) about the middle of the next century under conditions of subreplacement fertility (1.9 children per woman), moderate net immigration (450,000 per year), and moderately declining mortality. These assumptions correspond to those of the middle series of projections. Under these circumstances, the proportion of elderly persons (65 years and over) in the population would rise steadily until about 2050. Persons 65 years and over would then comprise about 22 percent of the total population. Similarly, the proportion of aged persons (75 years and over) would rise steadily to 2040 and then fall off slightly. Those 75 years and over would comprise about 12 percent of the total population in 2040.

The lowest population series would reach zero growth even earlier, about 2015, when the proportion of elderly persons in the total population would be about 16 percent. The total population will then turn downward as the number of deaths exceeds the number of births and net immigrants, but the percent of elderly persons will continue to rise because of the continuing low fertility and the entry of the baby boom cohorts into the elderly population. In a stationary population (i.e, a population with unchanging numbers at each age), subject to the middle death rates for 2050 and unaffected by net immigration, 22 percent of the population would be over age 65.

We sometimes read or hear statements that over one-third of the population of the United States will be over 65 years of age in another quarter to half century or that over one quarter of the population will be over age 65 by the end of the century. These figures were presumably derived by linear extrapolation of the past trend in the proportions of older persons. The statements are clearly unfounded. The former would be "possible" only if fertility continued at replacement or subreplacement levels and death rates at the higher ages were reduced to zero or near zero by the middle of the next century. (See the discussion of statistical immortality in chapter 5).

Aging of the older population. Even as the proportion of elderly persons in the total population has been rising, so the elderly population itself has been aging and is expected to continue to age (table 2-5). The proportion 65 to 74 years of age of the group 65 years and over is now becoming smaller, while the proportion 75 years and over is becoming larger. This trend will continue at least to the end of the century. In 1950, the proportion 75 years and over of the total 65 years and over was 31 percent; by 1980 the proportion had risen to 39 percent. We may expect about 50 percent of the 65-and-over group to fall in the 75-and-over group in the year 2000. After the year 2010, the aging trend of the population 65 years and over should reverse itself because of the shift in the trend of fertility after World War II. By 2020, the older share is expected to fall back to 42 percent.

The greater concentration of the elderly at the higher ages that will occur in the next few decades has important implications for the general welfare of the elderly population and for planning for their needs. We need to consider the numerical changes in relation to the different health conditions and living arrangements of the various segments of the elderly population, especially the relatively greater frequency of chronic debilitating conditions and the greater requirements for extended care among the extreme aged.

Role of demographic factors. As has been stated, the general rise in the numbers of births up to the early 1920's, declines in age-specific death rates in the last 100 years, and the heavy volume of immigration, especially prior to World War I, have contributed to the increase in the number of persons over age 65 since the turn of the century. The first factor, the rise in the number of births, has been of primary importance in accounting for the increase in the number of elderly persons. However, it has been the general decline in the birth rate which has been the principal contributor to the increase in the proportion of persons 65 years and over. The effect of the historical decline in the birth rate, extending up to the mid-thirties, has been reinforced by the recent decline in the rate (that is, from 1957 on) in contributing to the rise in the proportion 65 years and over.

A decline in fertility always contributes to a rise in the proportion of the older population, but contrary to intuitive judgment, declines in death rates do not cause a rise in the proportion of older persons unless the declines are concentrated at the older ages.[5] Between 1900 and 1954, increases in survival rates in the United States have been greater at the younger ages than the older ages. Hence, the changes in mortality in this period have had the effect of contributing to a reduction in the proportion of elderly persons and to a slight "younging" of the population, as Hermalin's analysis covering the period 1900-60 suggests.[6] In the period since 1968, improvements in survival rates for the older population have exceeded those for the younger population and, hence, have been contributing to the aging of the population.

---

[5] Ansley J. Coale, "The Effects of Changes in Mortality and Fertility on Age Composition," *Milbank Memorial Fund Quarterly*, Vol. XXXIV, No. 1, January 1956, pp. 79-114.

Immigration operates like mortality in its effect on age composition, i.e., it tends to reduce the proportion of older persons unless the migrants are concentrated in the older ages. The empirical analysis by Hermalin also showed that immigration led to a younger population in the United States in the first 60 years of this century.[7] The data on immigration between 1960 and 1980 suggest that this finding could be extended to cover the whole period 1900-80.

Such theoretical and historical analyses suggest that fertility levels will continue to be the principal actual or potential determinant of the proportion of the population in the older ages in future years. The proportion would rise markedly as a result of reductions in mortality only if the improvements are mainly confined to the older ages and are relatively large. Uniform percentage changes in the level of age-specific survival rates over time (that is, without changes in the age pattern of survival rates) would have no effect on the age structure of the population, and hence, the proportion of the elderly would tend to remain unchanged.[8] Because of the relatively low level of mortality at the ages below 50, future substantial reductions in mortality in the United States can occur only at the ages above 50. If such substantial reductions do occur, as is anticipated and as shown by the new Census Bureau projections, they will contribute to a perceptible aging of the population.

To evaluate the relative role of fertility, mortality, and immigration in the variations of the proportion of elderly persons in the population shown by the new Census Bureau projections, it is necessary to compare several series of projections in which only one of the components is permitted to vary. An indication of the effect on the proportion 65 years and over of variations in the level of mortality is given by proportions computed from series based on middle fertility, middle immigration, and high, middle, or low mortality (table 2-7). The effect of variations in fertility is suggested by proportions computed from series based on middle mortality, middle immigration, and high, middle, or low fertility (table 2-8).

We may note that, even though the assumptions on mortality allow for considerable variation in relation to their potential range and the assumptions on fertility are rather narrow in relation to their potential range, the range of variation in the proportions 65 years and over resulting from the variation in fertility assumptions clearly exceeds the range of variation in the proportions resulting from the variation in mortality assumptions by the early part of the next century.[9] The estimated range as a result of fertility variation, at the middle mortality level, is from 19.0 percent to 23.4 percent in the year 2030, while the estimated range in that year as a result of mortality variation, at the middle fertility level, is from 19.8 to 22.7 percent. (These proportions would be expected to be further apart than those based on the highest and lowest population series and this is in fact the case.) In later years the excess in the fertility range over the mortality range grows wider. The effect of fertility variation on the projections 65 years and over at the low and high mortality level shows only a slight or small difference from the range at the middle mortality level. Similarly, the effect of mortality variation at the high and low fertility level shows only a slight or small difference from the variation at the middle fertility level.

The net immigration anticipated in future years will have only a slight effect on the proportion of the total population in the older ages. Future net immigration should have a slightly minifying effect on the proportion over age 65. For example, the proportion 65 years and over in the year 2000 assuming middle fertility and mortality will be 13.4 percent for the population without immigration, as compared with 13.1 percent for the population with middle immigration (450,000 per year). The difference of 0.3 percentage point in 2000 grows to only 1.1 percentage points in 2050:

Year	Percent 65 and Over (middle fertility, middle mortality)			
	Zero immigration	Low immigration	Middle immigration	High immigration
2000	13.4	13.2	13.1	12.8
2010	14.4	14.0	13.9	13.5
2030	22.3	21.5	21.1	20.4
2050	22.8	22.0	21.7	21.0

Source: Unpublished tabulations consistent with U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 922.

---

[6] Albert I. Hermalin, "The Effect of Changes in Mortality Rates on Population Growth and Age Distribution in the United States," *Milbank Memorial Fund Quarterly*, Vol. XLIV, No. 4, Part I, October 1966, pp. 451-469.

[7] Hermalin, *op. cit.*, p. 461.

[8] Mathematically the uniformity must apply to the factors by which the age-specific proportions surviving from one date to another change rather than to the factors by which the age-specific death rates change. Uniform percentage reductions in age-specific death rates would correspond to greater relative increases in survival rates at the older ages and, hence, would result in a rise in the proportion of older persons.

[9] See also Jacob S. Siegel, "Prospective Trends in the Size and Structure of the Elderly Population, Impact of Mortality Trends, and Some Implications," in: U.S. House of Representatives, Joint Hearings Before the Select Committee on Population and the Select Committee on Aging, 95th Congress, Second Session, May 24, 1978, Vol. 1, *Consequences of Changing U.S. Population: Demographics of Aging*, pp. 76-121, especially table 12. Reprinted as U.S. Bureau of the Census, Current Population Reports, Series P-23, No. 78, January 1979.

Given the low level of mortality, the relatively low or moderate level of net immigration, and the limited prospect of major change in the magnitude of these components, it is possible that fertility will become even more determinative of future changes in age composition than it has been in the past. Since fertility is largely under voluntary control, fertility levels may fluctuate, although perhaps not as widely, as in the past. As a result, periods of aging of the population and periods of younging of the population may succeed one another. This possibility is reflected in the combined trends of the various series of population projections for the next half century.

The high and low series of projections of fertility incorporated in the Census Bureau's most recent population projections posit a difference in completed fertility of 0.7 child per woman and account for a difference of 122.2 million persons in 2050. Yet, all three fertility assumptions represent low fertility, the "high" assumption being just above replacement (2.3 children per woman). The prevailing view of demographers today is that, although fertility levels will fluctuate somewhat in the future, they will remain low indefinitely. Westoff points, for example, to the changed status and roles of women, the changed attitudes of women toward marriage, childbearing, and work, and the improvements in the technology of fertility control.[10] Small families are more compatible with the newly sought and achieved economic independence of women. In contrast to Westoff's sociologically oriented view are the more economically oriented theories offered by Becker, Butz and Ward, and Easterlin.[11] Only Easterlin's theory points toward rising fertility in the next few decades.

International variations. The proportion of persons 65 years and over in the United States is lower than in several other countries in the Western World. Sweden, France, Belgium, Austria, Norway, Denmark, and Great Britain, for example, have much higher proportions of elderly persons, some as high as 14 percent. The countries of Asia, Africa, and Latin America, on the other hand, tend to have much smaller proportions of elderly persons, some as low as 3 percent. As implied by the earlier discussion, the principal demographic factor which accounts for this wide difference is fertility. Where fertility is relatively low, as in the Western World, the proportion of older persons tends to be high; and where fertility is high, as in the less developed countries, the proportion of older persons tends to be low.[12] Mortality plays an important but secondary role in explaining the national variations in the proportion of the elderly. Fertility and mortality are both lower in most countries of Western Europe than in the United States, particularly the Scandanavian countries, and together account for the higher proportions of older persons there.

MEASUREMENT OF POPULATION AGING

Conventional measures. According to a variety of measures the population of the United States has been aging steadily or almost steadily for many decades. This is clearly shown by the unbroken rise in the proportion of the population 65 years or over between 1920 and 1980 (table 2-9). Other possible measures of population aging, such as the median age, the mean age, the ratio of the population 65 years and over to the population under 15 or under 65, and the slope of the regression line applied to a population pyramid, also move steadily upward through this period (except for the decline in median age, 1950-60 and 1960-70, in mean age, 1950-60, and in the slope of the regression, 1950-60). The measures other than the median age reflect changes at both ends of the age distribution or over the entire age distribution, and may be taken as superior to the median age, which is overly sensitive to population shifts just around the median. The various measures of population aging may indicate different degrees of aging for the same population, and a population may be described as aging and younging at the same time if, as did occur in the 1950-60 decade, the proportion of aged persons and the proportion of children both increase at the same time.[13]

If the mean age or the ratio of elderly persons to children is employed as a measure of population aging, the U.S. population could be described as growing substantially older in future years. The mean age would increase from 34.1 years in 1980 to 37.0 years in 2000 and 40.2 years in 2020, according to the middle series of projections. The ratio of persons 65 years and over to persons under 18, a very sensitive categorical measure of age distribution, would nearly double in this same period under the middle series.

New measures. Another index of the aging of populations, proposed by Kii, is the slope of the linear least-squares line fitted to the age distribution.[14] Unlike the conventional measures (except the mean age), this measure takes account of the entire age distribution. Yet, at least for the period 1900 to 2000, the relative changes in the index parallel the relative changes in the median age, a measure which depends minimally on variations in the age distribution. The fact that the measure takes account of the entire age distribution is not necessarily a logical advantage. The simple categorical measures, such as the aged-child ratio and the proportion of elderly persons in the population, reflect the aging process satisfactorily and can be more readily interpreted for use in connection with practical programs.

---

[10] Charles F. Westoff, "Some Speculations on the Future of Marriage and Fertility," *Family Planning Perspectives*, Vol. 10, No. 2, March/April 1978, pp. 79-83.

[11] Gary S. Becker, *A Treatise on the Family*, Harvard University Press, Cambridge, Mass., 1981; William P. Butz and Michael P. Ward, "Will U.S. Fertility Remain Low? A New Economic Interpretation," *Population and Development Review*, Vol. 5, 1979, pp. 663-688; and Richard A. Easterlin, "What Will 1984 Be Like? Socioeconomic Implications of Recent Twists in Age Structure," *Demography*, Vol. 15, No. 4, 1978, pp. 397-432.

[12] Jacob S. Siegel, "Demographic Background for International Gerontological Studies," *Journal of Gerontology*, Vol. 36, No. 1, Jan. 1981, pp. 93-102, and Jacob S. Siegel and Sally L. Hoover, *Demographic Aspects of the Health of the Elderly to the Year 2000 and Beyond*, World Health Organization, WHO/AGE/82.3, July 1982, prepared for the World Assembly on Aging, July-August 1982, Vienna, Austria.

[13] U.S. Bureau of the Census, *The Methods and Materials of Demography*, Henry S. Shryock, Jacob S. Siegel, and Associates, U.S. Government Printing Office, Washington, D.C., 1980 (fourth printing, rev.), pp. 234-235; Edward Rosset, *Aging Process of Population*, translated from the Polish by I. Dubosz and others and translation edited by H. Infeld, MacMillan Co., New York, 1964, esp. chapter 1.

[14] Toshi Kii, "A New Index for Measuring Demographic Aging," *Gerontologist*, Vol. 22, No. 4, August 1982, pp. 438-442.

It is also of interest to examine the indications of an alternative measure of population aging, suggested by Ryder, namely, the proportion of the population above the age corresponding to a life expectancy of 10 or 15 years.[15] In effect, this measure defines old age in terms of years until death and 10 years or 15 years is arbitrarily selected as the point of entry into old age. Ryder applied the measure to a variety of model (theoretical) stable populations with fixed mortality and growth rates, excluding immigration.

Interpretation of the results for actual populations is less apparent. It is evident that, under circumstances of declining mortality at the older ages, and hence of rising life expectation at these ages, any upward trend, however slight, in the proportion of the total population above the age with 10 years of average life remaining could be taken as an indication of an aging population. The rise in the minimal age of the group tends to militate against a rise in the proportion of the population above that age. If the proportion above the age with an expectancy of 10 years falls, this might result from a rapid rise in life expectancy rather than the actual aging of the population. From 1920 to 1970, the proportion of the U.S. population above the age corresponding to a life expectancy of 10 years showed a steady, substantial rise (table 2-10). From 1970 to 1980, however, the proportion decreased perceptibly. About 4.0 percent of the population had an age above 75.9 years in 1980, the age corresponding in 1980 to a life expectation of 10 years, as compared with 4.4 percent of the population in 1970, when age 73.7 years corresponded to a life expectancy of 10 years.

The same pattern is generally shown when 15 years of remaining lifetime is chosen as the point of entry into old age. Between 1940 and 1980, the age at which average remaining lifetime equalled 15 years rose from 61.4 to 67.3, or by about 6 years. In these two years, the proportion of the population above the ages noted was the same, 9.4 percent, although the proportion rose and fell notably in the intervening years.

The concept of years until death could serve as the basis for a new measure of individual aging. Specifically, the demarcation line for "old age" could be a variable line which recognizes the fact that, as life expectancy increases, old age starts at increasingly higher ages. Such a linkage of the definition of old age to changing longevity may be a basis for defining old age in programs where funding is affected by the length of life (e.g., Social Security benefits). Life expectancy of older persons has increased greatly (4 years) since the Social Security Act went into effect in 1935, and if the proportion of the population covered by Social Security must be kept at the same level, one device for achieving this is to shift the age at which full benefits are initially paid gradually upward to correspond to the changes in life expectancy. The demographic factors affecting the Social Security program are discussed further in chapter 8.

---

[15] Norman Ryder, "Notes on Stationary Populations," *Population Index*, Vol. 41, No. 1, Jan. 1975, pp. 3-28, esp. pp. 16-17.

Table 2-1. Total Population in the Older Ages and Decennial Increases: 1950 to 2040

(Numbers in thousands. Estimates and projections as of July 1. Figures refer to the total population of the 50 States and District of Columbia. A minus sign (-) denotes a decrease. See text for explanation of middle, highest, and lowest projection series. Base date of projections is July 1, 1981)

Year	60 years and over			65 years and over			70 years and over			75 years and over			85 years and over		
		Increase in preceding decade			Increase in preceding decade			Increase in preceding decade			Increase in preceding decade			Increase in preceding decade	
	Number	Amount	Percent	Number	Amount	Percent	Number	Amount	Percent	Number	Amount	Percent	Number	Amount	Percent
ESTIMATES															
1950............	18,500	(X)	(X)	12,397	(X)	(X)	7,368	(X)	(X)	3,904	(X)	(X)	590	(X)	(X)
1960............	23,828	5,328	28.8	16,675	4,278	34.5	10,394	3,046	41.5	5,621	1,717	44.0	940	350	59.3
1970............	28,753	4,925	20.7	20,087	3,412	20.5	13,065	2,671	25.7	7,600	1,979	35.2	1,432	492	52.3
1980............	35,842	7,089	24.7	25,708	5,621	28.0	16,904	3,839	29.4	10,061	2,461	32.4	2,274	842	58.8
PROJECTIONS															
Middle Series															
1990............	42,438	6,596	18.4	31,799	6,091	23.7	21,793	4,889	28.9	13,745	3,684	36.6	3,461	1,187	52.2
2000............	45,530	3,092	7.3	35,036	3,237	10.2	25,926	4,133	19.0	17,343	3,598	26.2	5,136	1,675	48.4
2010............	55,278	9,748	21.4	39,269	4,233	12.1	27,579	1,653	6.4	18,990	1,647	9.5	6,818	1,682	32.7
2020............	71,150	15,872	28.7	51,386	12,117	30.9	34,795	7,216	26.2	21,617	2,627	13.8	7,337	519	7.6
2030............	81,557	10,407	14.6	64,344	12,958	25.2	46,259	11,464	32.9	29,929	8,312	38.5	8,801	1,464	20.0
2040............	82,689	1,132	1.4	66,642	2,298	3.6	51,778	5,519	11.9	37,475	7,546	25.2	12,946	4,145	47.1
Highest Series															
1990............	42,[illegible]	7,044	19.7	32,169	6,461	25.1	22,074	5,170	30.6	13,946	3,885	38.6	3,563	1,289	56.7
2000............	47,346	4,460	10.4	36,622	4,453	13.8	27,279	5,205	23.6	18,453	4,507	32.3	5,764	2,201	61.8
2010............	59,235	11,889	25.1	42,672	6,050	16.5	30,497	3,218	11.8	21,469	3,016	16.3	8,405	2,641	45.8
2020............	77,966	18,731	31.6	57,038	14,366	33.7	39,458	8,961	29.4	25,418	3,949	18.4	9,763	1,358	16.2
2030............	91,851	13,885	17.8	73,191	16,153	28.3	53,581	14,123	35.8	35,743	10,325	40.6	12,107	2,344	24.0
2040............	96,731	4,880	5.3	78,998	5,807	7.9	62,450	8,869	16.6	46,414	10,671	29.9	18,159	6,052	50.0
Lowest Series															
1990............	41,946	6,104	17.0	31,386	5,678	22.1	21,447	4,543	26.9	13,460	3,399	33.8	3,318	1,044	45.9
2000............	43,808	1,862	4.4	33,540	2,154	6.9	24,638	3,191	14.9	16,272	2,812	20.9	4,540	1,222	36.8
2010............	51,741	7,933	18.1	36,260	2,720	8.1	25,024	386	1.6	16,839	567	3.5	5,525	985	21.7
2020............	65,531	13,790	26.7	46,642	10,382	28.6	30,888	5,864	23.4	18,506	1,667	9.9	5,529	4	0.1
2030............	73,459	7,928	12.1	57,321	10,679	22.9	40,417	9,529	30.9	25,296	6,790	36.7	6,432	903	16.3
2040............	72,095	-1,364	-1.9	57,244	-77	-0.1	43,632	3,215	8.0	30,682	5,386	21.3	9,258	2,826	43.9

X Not applicable.

Source: U.S. Bureau of the Census, Current Population Reports, Series P-25, Nos. 311, 519, 614, 917, and 922.

Table 2-2. Decennial Percent Increase of the Population for Broad Age Groups: 1950 to 2020

(A minus sign(-) denotes a decrease. Periods extend from July 1 of initial year to June 30 of terminal year. See text for explanation of middle, highest, and lowest projection series; base date of projections is July 1, 1981)

Age	1950 to 1960	1960 to 1970	1970 to 1980	Projections											
				Middle series				Highest series				Lowest series			
				1980 to 1990	1990 to 2000	2000 to 2010	2010 to 2020	1980 to 1990	1990 to 2000	2000 to 2010	2010 to 2020	1980 to 1990	1990 to 2000	2000 to 2010	2010 to 2020
All ages.......	18.7	13.4	10.8	9.7	7.3	5.7	4.7	11.9	10.9	10.2	9.9	8.1	4.1	2.0	0.4
Under 15 years.......	36.8	3.2	-11.5	6.4	2.4	-4.3	3.2	11.0	10.6	4.4	12.5	1.9	-6.4	-10.2	-4.1
15 to 24 years.......	9.9	48.5	16.2	-16.9	1.6	8.0	-7.0	-15.6	4.2	16.2	0.8	-17.2	-0.3	-2.3	-12.6
25 to 44 years.......	3.2	2.7	30.4	28.2	-1.5	-8.0	4.7	30.3	0.4	-5.8	9.7	27.5	-2.7	-9.6	-1.2
45 to 54 years.......	17.9	13.3	-2.5	11.7	46.1	15.6	-15.8	12.6	48.0	18.1	-13.8	10.8	44.7	14.2	-17.2
55 to 64 years.......	16.6	19.5	16.4	-3.0	12.8	46.5	15.5	-2.3	14.2	48.6	18.2	-3.8	11.3	44.8	14.1
65 to 74 years.......	30.1	13.0	2[illegible].3	15.4	-2.0	14.6	46.8	16.5	-0.3	16.7	49.1	14.6	-3.7	12.5	44.9
75 to 84 years.......	41.2	31.8	25.9	32.1	18.7	-0.3	17.3	33.3	22.2	3.0	19.8	30.2	15.7	-3.6	14.7
85 years and over....	59.3	52.3	59.0	52.2	48.4	32.7	7.6	56.7	61.8	45.8	16.2	45.9	36.8	21.7	0.1
65 and over..........	34.3	20.5	28.0	23.7	10.2	12.1	30.9	25.1	13.8	16.5	33.7	22.1	6.9	8.1	28.6

Source: U.S. Bureau of the Census, Current Population Reports, Series P-25, Nos. 311, 519, 614, 917, and 922.

Table 2-3. Illustrative Estimates of the Contribution of Births and Deaths to Change in the Population 60 to 69 Years of Age: 1950 to 2010

(The contribution of net migration is not shown and cannot be closely inferred as a residual from these data since changes in the population and in the components are not entirely consistent)

Year or period	Population 60 to 69 years			Births 60 to 69 years earlier			Survival rate, birth to 60 to 69 years[4]	
	Number	Percent increase in preceding decade[1]	Absolute increase[1] [2]	Number[3]	Percent increase in preceding decade[1]	Absolute increase[1] [2]	Rate	Relative change (percent)
1950..................	11,152	(X)	(X)	21,193	(X)	(X)	.672	(X)
1960..................	13,434	20.5	(X)	23,923	12.9	(X)	.707	5.2
1970..................	15,688	16.8	-3.7	26,215	9.6	-3.3	.716	1.3
1980..................	18,939	20.7	3.9	28,557	8.9	-0.7	.762	6.4
1990..................	[5]20,645	9.0	-11.7	27,826	-2.6	-11.5	.801	5.1
2000..................	[5]19,604	-5.0	-14.0	24,162	-13.2	-10.6	.817	2.0
2010..................	[5]27,699	41.3	46.3	32,008	32.5	45.7	.823	0.7
1950-1980............	(X)	69.8	(X)	(X)	34.7	(X)	(X)	13.4
1980-2010............	(X)	46.3	-23.5	(X)	12.1	-22.6	(X)	8.0
1950-2010............	(X)	148.4	(X)	(X)	51.0	(X)	(X)	22.5

X Not applicable.

[1] Minus sign (-) denotes a decrease. Percent increase also shown for broad periods.
[2] Absolute increase between entries in column "percent increase in preceding decade."
[3] White and Black births only. Figures are adjusted for underregistration.
[4] Rates are only illustrative since they are derived from current life tables.
[5] Middle population series.

Source: Based on U.S. Bureau of the Census, Current Population Reports, Series P-25, Nos. 519, 917, and 922; Ansley J. Coale and Norfleet W. Rives, Jr., "A Statistical Reconstruction of the Black Population of the United States, 1880-1970: Estimates of True Numbers by Age and Sex, Birth Rates, and Total Fertility," Population Index, January 1973, pp. 3-36; Ansley J. Coale and Melvin Zelnik, New Estimates of Fertility and Population in the United States, Princeton University Press, Princeton, N.J. 1963; U.S. Public Health Service, National Center for Health Statistics, United States Life Tables: 1959-61, and U.S. Decennial Life Tables: 1969-71; Office of the Actuary, U.S. Social Security Administration, Life Tables for the United States, 1900-2050, Actuarial Study No. 87, by Joseph F. Faber, Sept. 1982.

Table 2-4. Estimates of the Demographic Components of Change in the Population 65 Years and Over: 1970-80, 1960-70, and 1950-60

(Numbers in thousands)

Item and period	July 1, 1970, to July 1, 1980	April 1, 1960, to April 1, 1970	April 1, 1950, to April 1, 1960
Population 65 years and over, terminal date..........	25,707	19,972	16,560
Population 65 years and over, initial date..........	20,107	16,560	12,295
Net increase..........	5,600	3,412	4,265
Number reaching age 65..........	17,897	14,388	12,564
Net "migrants" 65 years and over..........	53	68	62
Deaths 65 years and over..........	12,442	10,979	8,714
Deaths to initial population 65 years and over..........	10,051	8,833	6,636
Deaths to persons reaching age 65..........	2,391	2,146	2,078
Gross change[1]..........	30,393	25,435	21,340
Rate of gross gain[2]..........	89.3	87.3	102.7
Rate of gross loss[3]..........	61.9	66.3	90.9
Rate of net gain..........	27.4	21.0	11.8
Population 65 to 74 years as a percent of population 65 years and over, terminal date..........	60.9	62.3	66.4
Ratio, net change to gross change[1]..........	.184	.138	.200
Mortality rate of population 65 years and over[4]..........	32.7	35.5	35.1
Mortality rate of initial population 65 years and over (per 100)...	50.0	53.3	54.0
Mortality rate for persons reaching age 65 (per 100)..........	13.4	14.9	16.5

[1] Gross change represents the sum of persons reaching age 65, net migrants, and deaths 65 years and over. It does not include the "error of closure," the residual (4.8 million for all classes, 1970-80, 0.3 million for 1960-70, and 0.4 million for 1950-60) representing the difference between net increase based on the census counts and net change based on the components of change. "Net increase" in the table represents the difference between the census counts, including the "error of closure."
[2] Number reaching age 65 plus net migrants per 100 initial population.
[3] Total deaths per 100 initial population.
[4] Per 100 initial population 65 years and over plus persons reaching age 65 during the period.

Source: Population data are from the Census of Population for 1980, 1970, 1960, and 1950, and mortality and migration statistics are from unpublished Bureau of the Census records.

Table 2-5. Percent of the Total Population in the Older Ages: 1950 to 2020

(Figures as of July 1. Based on the total population including Armed Forces overseas. See text for explanation of middle, highest, and lowest projection series; base date of projections is July 1, 1981)

Age	1950	1960	1970	1980	Projections[1]					
					1985			1990		
					Middle series	Highest series	Lowest series	Middle series	Highest series	Lowest series
60 years and over	12.1	13.2	14.1	15.7	16.6	16.5	16.6	17.0	16.8	17.1
65 years and over	8.1	9.3	9.9	11.3	12.0	12.0	12.0	12.7	12.6	12.8
70 years and over	4.8	5.8	6.4	7.4	8.1	8.1	8.2	8.7	8.7	8.7
75 years and over	2.6	3.1	3.7	4.4	4.9	4.9	4.9	5.5	5.5	5.5
80 years and over	1.1	1.4	1.8	2.3	2.6	2.6	2.6	3.0	3.0	3.0
85 years and over	0.4	0.5	0.7	1.0	1.2	1.2	1.2	1.4	1.4	1.4

Age	Projections[1]--Continued								
	2000			2010			2020		
	Middle series	Highest series	Lowest series	Middle series	Highest series	Lowest series	Middle series	Highest series	Lowest series
60 years and over	17.0	16.8	17.1	19.5	19.0	19.8	24.0	22.8	25.0
65 years and over	13.1	13.0	13.1	13.9	13.7	13.9	17.3	16.7	17.8
70 years and over	9.7	9.7	9.6	9.7	9.8		11.7	11.5	11.8
75 years and over	6.5	6.5	6.4	6.7	6.9	6.5	7.3	7.4	7.1
80 years and over	3.8	3.9	3.6	4.3	4.6	4.0	4.4	4.7	4.0
85 years and over	1.9	2.0	1.8	2.4	2.7	2.1	2.5	2.9	2.1

[1] Percents for the highest and lowest projection series do not represent a range (i.e., uncertainty interval) around the percents for the middle series. See text for explanation.

Source: U.S. Bureau of the Census, Current Population Reports, Series P-25, Nos. 311, 519, 614, 917, and 922.

Table 2-6. Percent Distribution of the Population 65 Years and Over, by Age: 1950 to 2020

(Estimates and projections as of July 1)

Age	1950	1960	1970	1980	Projections[1]		
					1990		
					Middle series	Highest series	Lowest series
65 years and over	100.0	100.0	100.0	100.0	100.0	100.0	100.0
65 to 69 years	40.7	37.7	35.0	34.2	31.5	31.4	31.7
70 to 74 years	27.8	28.6	27.2	26.6	25.3	25.3	25.4
75 to 79 years	17.4	18.5	19.2	18.7	19.6	19.5	19.6
80 to 84 years	9.3	9.6	11.5	11.6	12.8	12.8	12.7
85 years and over	4.8	5.6	7.1	8.8	10.9	11.1	10.6

Age	Projections[1]--Continued								
	2000			2010			2020		
	Middle series	Highest series	Lowest series	Middle series	Highest series	Lowest series	Middle series	Highest series	Lowest series
65 years and over	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
65 to 69 years	26.0	25.5	26.5	29.8	28.5	31.0	32.3	30.8	33.8
70 to 74 years	24.5	24.1	24.9	21.9	21.2	22.6	25.6	24.6	26.5
75 to 79 years	20.7	20.4	20.9	17.1	16.7	17.4	17.0	16.6	17.2
80 to 84 years	14.2	14.2	14.1	13.9	13.9	13.8	10.8	10.9	10.6
85 years and over	14.7	15.7	13.5	17.4	19.7	15.2	14.3	17.1	11.9

[1] Base date of projections is July 1, 1981. See text for explanation of middle, highest, and lowest series. Percents for the highest and lowest projection series do not represent a range (i.e., uncertainty interval) around the percents for the middle series. See text for explanation.

Source: U.S. Bureau of the Census, Current Population Reports, Series P-25, Nos. 311, 519, 614, 917, and 922.

Table 2-7. Projections of the Percentage of the Total Population 65 Years and Over According to Middle Fertility, Middle Immigration, and Alternative Assumptions of Mortality: 1990 to 2050

Year	High mortality	Middle mortality	Low mortality	Range, high-low mortality
1990	12.6	12.7	12.8	0.2
2000	12.7	13.1	13.5	0.8
2010	13.2	13.9	14.7	1.5
2020	16.4	17.3	18.5	2.1
2030	19.8	21.1	22.7	2.9
2040	19.9	21.6	23.7	3.8
2050	19.6	21.9	24.1	4.5

Source: Based on unpublished tabulations corresponding to U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 922.

Table 2-8. Projections of the Percentage of the Total Population 65 Years and Over According to Middle Mortality, Middle Immigration, and Alternative Assumptions of Fertility: 1990 to 2050

Year	High fertility	Middle fertility	Low fertility	Range, high-low mortality
1990	12.7	12.7	12.8	0.1
2000	12.8	13.1	13.4	0.6
2010	13.3	13.9	14.5	1.2
2020	16.1	17.3	18.6	2.5
2030	19.0	21.1	23.4	4.4
2040	18.6	21.6	24.9	6.3
2050	17.8	21.9	26.0	8.2

Source: Based on unpublished tabulations corresponding to U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 922.

Table 2-9. Comparison of Various Measures of the Aging of the Population: 1920 to 2020

(Estimates and projections as of July 1. Figures include Armed Forces overseas for 1940 and later years)

Year	Percent 65 years and over	Median age	Mean age	$\frac{P_{65+}}{P_{0-17}}$[1]	$\frac{P_{65+}}{P_{0-64}}$[2]	Change in preceding decade: Percent 65 years and over	Median age	Mean age	$\frac{P_{65+}}{P_{0-17}}$[1]	$\frac{P_{65+}}{P_{0-64}}$[2]
1920	4.6	25.9	28.1	.12	.05	(X)	(X)	(X)	(X)	(X)
1930	5.4	26.5	29.4	.16	.06	+0.8	+0.6	+1.3	+.04	+.01
1940	6.8	29.1	31.6	.22	.07	+1.4	+2.6	+2.2	+.06	+.01
1950	8.1	30.2	32.1	.26	.09	+1.3	+1.1	+0.5	+.04	+.02
1960	9.2	29.4	31.7	.26	.10	+1.1	-0.8	-0.3	-	+.01
1970	9.8	27.9	32.0	.29	.11	+0.6	-1.5	+0.2	+.03	+.01
1980	11.3	30.0	34.1	.40	.13	+1.5	+2.1	+2.1	+.11	+.02
PROJECTIONS[3]										
Middle series:										
1990	12.7	33.0	35.4	.49	.15	+1.4	+3.0	+1.3	+.09	+.02
2000	13.1	36.3	37.0	.52	.15	+0.4	+3.3	+1.6	+.03	-
2010	13.9	38.4	38.8	.61	.16	+0.8	+2.1	+1.8	+.09	+.01
2020	17.3	39.3	40.2	.78	.21	+3.4	+0.9	+1.4	+.17	+.05
Highest series:										
1990	12.6	32.8	35.1	.48	.14	+1.3	+2.8	+1.0	+.08	+.01
2000	13.0	35.6	36.5	.49	.15	+0.4	+2.8	+1.4	+.01	+.01
2010	13.7	36.8	37.8	.54	.16	+0.7	+1.2	+1.3	+.05	+.01
2020	16.7	36.8	38.7	.65	.20	+3.0	-	+0.9	+.11	+.04
Lowest series:										
1990	12.8	33.2	35.6	.51	.15	+1.5	+3.2	+1.5	+.11	+.02
2000	13.1	37.0	37.6	.56	.15	+0.3	+3.8	+2.0	+.05	-
2010	13.9	39.9	39.7	.68	.16	+0.8	+2.9	+2.1	+.12	+.01
2020	17.8	41.7	41.7	.92	.22	+3.9	+1.8	+2.0	+.24	+.06

- Less than 0.05 (median age) or 0.005 (ratios).
X Not applicable.

[1] Ratio of the population 65 years and over to the population under 18 years of age.
[2] Ratio of the population 65 years and over to the population under 65 years of age.
[3] Base date of projections is July 1, 1981. See text for explanation of middle, highest, and lowest projection series.

Source: Measures for 1920-80 are based on data from U.S. Bureau of the Census, Current Population Reports, Series P-25, Nos. 519, 614, and 917. Projections are based on data from Current Population Reports, P-25, No. 922.

Table 2-10. Age at Which Average Years of Remaining Life Equals 10 or 15 and the Percentage of Total Population Above This Age: 1920 to 1980

Year	10 years of average remaining life: Age at which average remaining life equals 10.0 years	Percent of total population above this age	15 years of average remaining life: Age at which average remaining life equals 15.0 years	Percent of total population above this age
1920	[1]69.4	[2]2.9	[1]60.8	[2]7.0
1930	69.1	[2]3.5	60.3	[2]8.3
1940	70.0	[2]4.0	61.4	[2]9.4
1950	71.7	[2]3.9	63.1	[2]9.6
1960	72.5	4.2	64.0	10.0
1970	73.7	4.4	65.0	9.8
1980	75.9	4.0	67.3	9.4

[1] Death Registration States of 1920.
[2] United States, excluding Alaska and Hawaii.

Source: Based on various official U.S. life tables and population data from 1930 Census of Population and Current Population Reports, Series P-25, Nos. 311, 519, 870, and 917.

Chapter 3.
Sex, Race, and Ethnic Composition

SEX COMPOSITION

A large majority of older persons in the United States are women, whereas at the younger ages there is an excess of males or a small excess of females. The characteristic pattern of variation of sex ratios (males per 100 females) with respect to age is a generally progressive decline throughout the age span, from a small excess of boys among young children to a massive deficit of men in extreme old age. In 1980 there were only 68 males for every 100 females 65 years and over in the United States (table 3-1 and figure 3-1). At ages 75 and over there were only 55 males for every 100 females.

Only 50 years ago, just as many males as females were reported at ages 65 and over, but there has been a steady decline in the proportion of men and, hence, an increasing excess of women since that time. The Census Bureau population projections imply that the sex ratio of the population 65 and over will continue to fall in the next few decades, but more slowly than in the past, reaching 64 males per 100 females in the year 2000.

These facts (the decline in the sex ratio with age at a particular date and the decline in the sex ratio of the older population over time) call for somewhat different but related explanations. The sex ratio of an age group in the resident population of the United States as reported or estimated may be viewed as determined by three basic factors: the sex ratio at birth, differences between the sexes in age-specific rates of survival from birth, and the balance of males and females among net "immigrants" and net "movers" overseas, including the net movement to outlying areas and the net movement of Armed Forces personnel and of Federal civilian employees and their dependents to foreign countries. The proportion of males and females in a broad age group, such as the group 65 years old and over, is also affected by the distribution by age within the broad age group. Finally, the sex ratio, as shown by census data or extensions of census data, is affected by sex differences in net coverage errors and net age reporting errors in census data. These factors operate on specific cohorts of births as the cohorts progress through life from the time of birth to their extinction.

The pattern of variation of sex ratios by age previously noted reflects essentially the persistent excess of boys among new-born infants (5.3 percent in 1978 and 5.2 percent in 1938) and the progressive effect of higher death rates for males than for females over the entire age range, both in recent years and in the historical past. These factors explain the low sex ratio of the older population in any particular year.

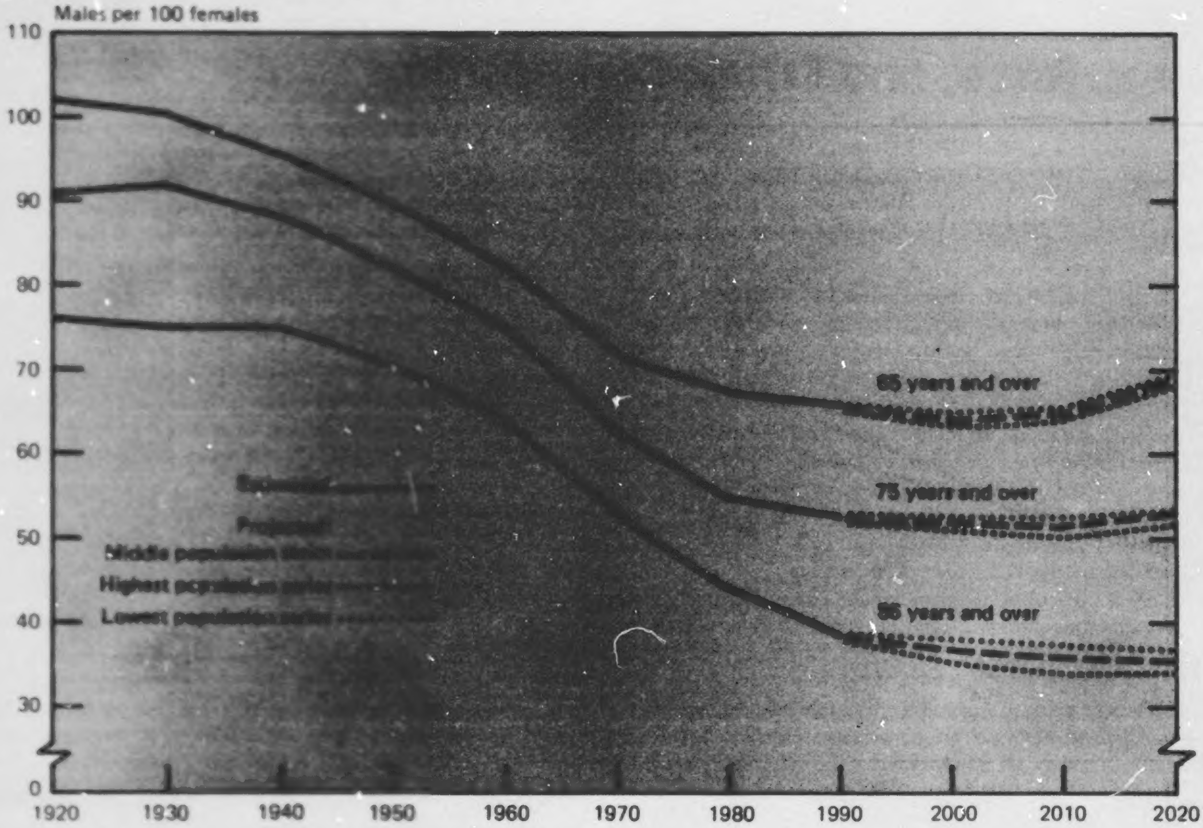
In explanation of the second fact (the decline in the sex ratio of the older population over time) males have benefited less than females from the historical declines in death rates, with the result that there has been a more rapid reduction in the sex ratio over the age span from birth to old age in more recent years than in the past, and the sex ratios of the elderly population have steadily fallen over time. The effects of World War II on the sex ratio are not readily discernible, even in the age cohorts most affected (i.e., 55-59 and 60-64 in 1980), because of the relatively low casualty rate and the dispersion over time and ages of the casualties. The heavy, predominantly male immigration prior to World War I is still reflected in the sex ratio of the population 65 and over, but its influence is small now except in the 80-and-over age group. The continuation of the decline in the sex ratio of the population over age 65 to the year 2000 shown by the latest projections of population results from the aging of the elderly population, which places greater weight on the lower sex ratios of the higher ages, and the assumption that male and female death rates will continue to diverge.

These factors are also reflected in the much more rapid growth of the female population 65 years and over than of the male population at these ages (table 3-2). Between 1970 and 1980, for example, the female population 65 years and over grew more than one-third more rapidly (31 percent) than the male population 65 and over (23 percent). During the 1960-70 decade the female population 65 and over grew more than twice as rapidly. The growth rates for the two sexes at the younger ages during these decades were more nearly equal. As a result, the proportion 65 years and over among females has moved well above that for males (figure 3-2). While the proportions for the two sexes were nearly equal in 1930 (5.5 percent and 5.4 percent), by 1980 the proportions had moved far apart (13.1 percent and 9.4 percent). (See table 3-3.) The excess of the female proportion is expected to become even greater in the future. The middle, or "most probable," projection series shows 15.5 percent for females and 10.5 percent for males, or a difference of 5.0 percentage points, in 2000.

We can largely explain the current difference between the sexes in the proportions 65 years and over by the higher birth rate of the male population than of the female population, in association with the higher mortality of males, particularly at the ages below 65 (which reduces

FIGURE 3-1.

Sex Ratios in the Older Ages: 1920 to 2020



Note: Estimates and projections as of July 1, except for 85 and over 1920 and 1930, which relate to April 1. Points are plotted for years ending in zero.

Source: Table 3-1 and unpublished data.

the relative number of survivors at the older ages). Birth rates of the male population have consistently exceeded the birth rates of the female population for many years:

Sex	Births per 1,000 population		
	1950	1965	1979
Male	24.9	20.3	16.7
Female	23.3	18.6	15.1
Percent excess, male over female	6.9	9.1	10.6

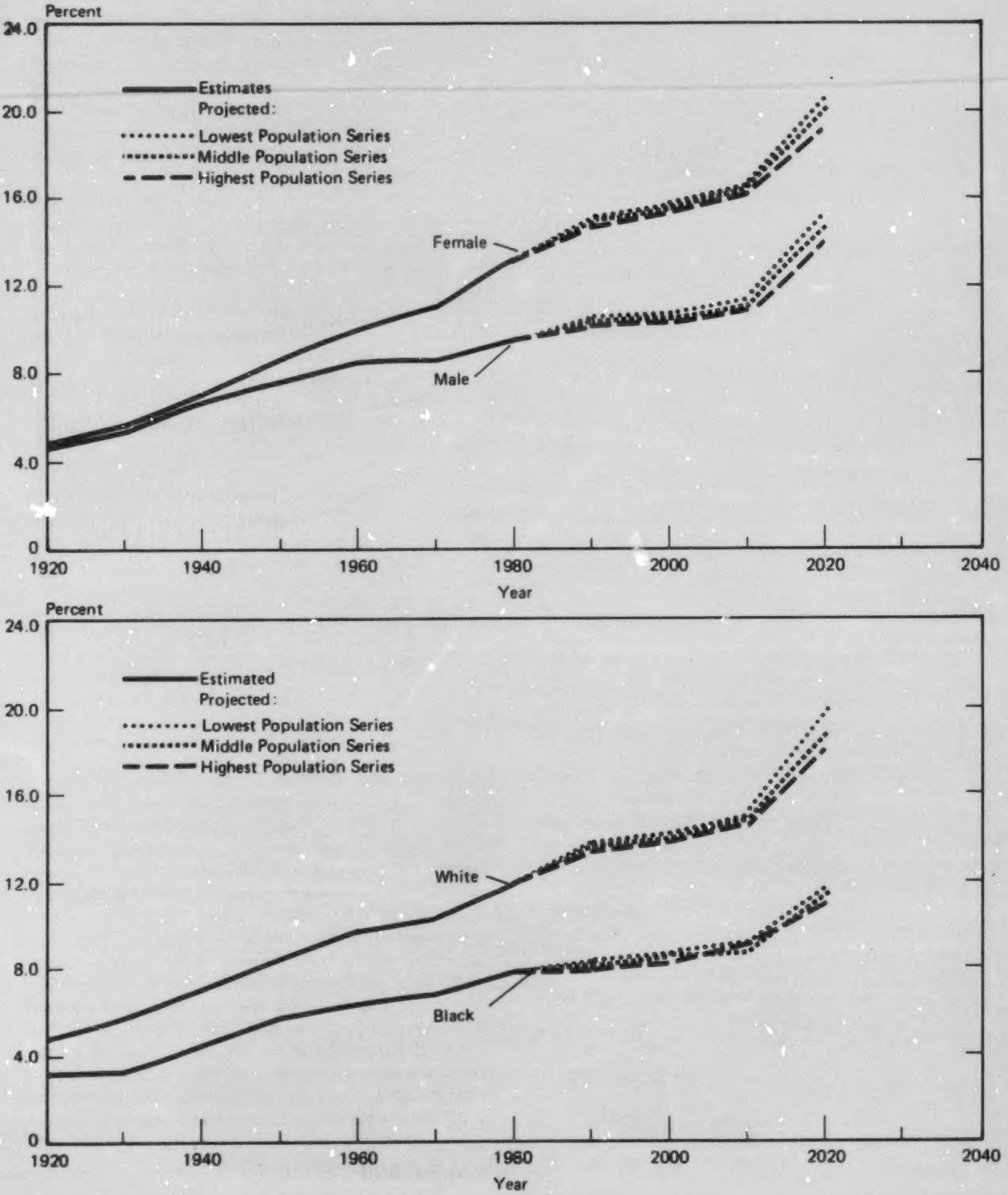
The gap in the birth rates of the sexes results mainly from the declining balance of males to females in the population brought about by the excess mortality of males. Survival rates of females have not only exceeded those of males for many decades but the advantage of females has steadily grown. The excess of life expectancy at birth of females in 1978 was 7.7 years. A sex ratio at birth favoring males is also a factor; as mentioned, a 5 to 5 1/2 percent excess of boys among births is "the rule."

The sex ratio of the elderly population in 1980 corresponds to an excess of 5.0 million women, or 19 percent of the total population 65 years and over. Twenty years earlier, in 1960, the excess was relatively small, 0.7 million, or 5.5 percent of the total. According to the latest Census Bureau population projections, 20 years from now, in 2000, the excess will grow to a huge 7.6 million, or 22 percent of the total population 65 and over.

RACE COMPOSITION

Age-sex structure. A much smaller proportion of the Black population is 65 years and over than of the White

FIGURE 3.2.
Percent of the Total Population 65 Years and Over, by Sex and by Race: 1920 to 2020



Note: Black and other races, 1920 to 1940.
Source: Table 3.3 and Current Population Reports, Series P-25, No. 311.

population (7.8 percent vs. 11.9 percent in 1980), and the difference has been widening (table 3-3). The difference results principally from the higher fertility of the Black population and secondarily from its higher mortality at the ages below 65 (which reduces the number of survivors at the older ages). In addition, the relatively greater concentration of declines in mortality at the younger ages among Blacks than among Whites and the large immigration of Whites prior to World War I have contributed to the difference.

The difference in fertility may be illustrated by a comparison of crude birth rates and total fertility rates in 1979:

Race	Crude birth rate	Total fertility rate[1]
White	14.8	1,758
Black	22.3	2,336
Percent excess, Black over White	50.8	32.9

[1] The total number of births 1,000 women would have in their lifetime according to the age-specific birth rates of 1979, assuming none of the women die before the end of the childbearing period.

Source: National Center for Health Statistics, *Monthly Vital Statistics Report*, "Advance Report, Final Natality Statistics, 1979," Vol. 30, No. 6, Supplement 2, September 1981.

Smaller proportions of Blacks than Whites survive to old age, but survival within old age is more alike for the two races. For example, according to life tables for 1978, 77 percent of Whites survive from birth to age 65 as compared with 65 percent for Blacks, but the percentages were 34 and 31 for survival from age 65 to age 85. Life expectancies of Whites and Blacks have converged sharply in the last half century, but the convergence was essentially confined to the ages under 65, and life expectancies over 65 have moved *pari passu* for the races. A consequence of this age-limited convergence of mortality is the widening of the gap between the proportions 65 and over as the proportions for each race rose.

The widening of the excess of the proportion of elderly Whites over the proportion for elderly Blacks has been associated with a more rapid growth of elderly Blacks than of elderly Whites (table 3-2). We can explain this seeming contradiction by the fact that the Black population under age 65 has also been growing much more rapidly than the corresponding White population. The recent and prospective excess of the decennial growth rates of elderly Blacks over elderly Whites varies from a negligible amount to over 100 percent. An important explanatory factor here is the past differences between the races in the rate of increase in the number of births.

As a result of differences in life expectancy at the older ages favoring females and Blacks, particularly Black females, these groups show an average remaining lifetime of 10 years at a higher age than do males and Whites, especially White males (table 3-4). Accordingly, the more favored groups show a smaller proportion of the population above these ages than do the less favored groups. If the age at which a population has 10 years of remaining lifetime is arbitrarily designated as the point of entry into old age, White males now reach old age (72 years) long before Black females (85 years), and a much larger proportion of the White male population (4.6 percent) than of the Black female population (1.1 percent) falls in the old-age bracket.

The sex ratio of the Black population at ages 65 and over had been substantially higher than the sex ratio of the White population at these ages for many decades, but the reported difference has been diminishing and in 1980 was quite small. In 1980, the comparative figures were 68.0 and 67.2 (table 3-1). The sex ratio of the elderly Black population has been rather low (below 90) at least since 1960, as has the sex ratio of the elderly White population. The age pattern of sex ratios for the Black population is very roughly like that for Whites, but the decline with age is less steep. The sex ratios at the younger ages are lower than for Whites, largely because the sex ratio of births among Blacks (102.8 in 1978 and 102.2 in 1938) is lower than for Whites (105.8 in 1978 and 105.6 in 1938). For all ages, the sex ratios of the races are affected not only by the sex ratio at birth but also by the difference between the races in the sex balance of deaths and immigrants and in the rates for these components. The figures first meet at about ages 70-74. The sex ratios as recorded at the older ages are higher for Blacks, possibly because of the narrower gap between male and female mortality rates for Blacks at the older ages and the relatively greater coverage of males than females at the ages above 65 in the census.

Gross and net changes. We may analyze the net changes in the White and Black populations that have occurred during the 1970-80 and 1960-70 decades in relation to the gross changes, i.e., in terms of population turnover. For this purpose we consider the following measures: The percentage of the population 65 years old and oler at the end of the decade falling in the 65-74-year group (i.e., the percentage of the total 65 and over made up of surviving new entrants to the group) and the growth effectiveness ratio (i.e., the ratio of the net increase in the population 65 years and over to the gross change in this age group).

Of the White males 65 years and over in 1980, 65 percent joined after 1970, and of White females in 1980, 57 percent joined after 1970 (table 3-5). The proportion of Blacks in 1980 that joined after 1970 was higher than for Whites for each sex. Specifically, of Black males 65 years and over in 1980, 67 percent joined after 1970, and of Black females in 1980, 62 percent joined after 1970. These figures suggest that population turnover among the elderly is greater for Blacks and males.

The rate of gross increase and the rate of gross loss based on the components of change in the population during the 1970-80 decade were each smaller for Whites than for Blacks.[16] For each race, the rate of gross increase and the rate of gross loss were smaller for males than females. The rate of net increase, i.e., the difference between the gross increase rate and the gross loss rate, for White males was 21 percent and for White females 29 percent; the corresponding figures for Blacks were 29 percent for males and 47 percent for females.

The rate of turnover as measured by the growth-effectiveness ratio was also greater for the Black population than for the White population and for males than females within each race. A lower growth-effectiveness ratio indicates more turnover. The growth-effectiveness ratio of the White female population for the 1970-80 decade was 0.222 compared with 0.131 for the White male population. The growth-effectiveness ratio for Black females was far greater than for Blacks males (.256 vs. 143). These sex differences result principally from the much higher male mortality.

ETHNIC COMPOSITION

Hispanic origin. The population of Hispanic origin currently has a very low proportion of persons 65 years and over (4.9 percent in 1980). The relevant explanatory factors appear to be similar to those applicable in the comparison of the Black and White populations.[17] A very large volume of immigration, consisting disproportionately of young people, also contributed to depressing the percentage of the elderly among Hispanics. The Hispanic population also has a relatively high sex ratio at ages 65 and over (76 males per 100 females in 1980) in comparison with the White population and the Black population. The sex ratio at birth of Hispanics is presumed to be intermediate between that of Whites and Blacks although the evidence is unclear. In addition, males have dominated among immigrants of Hispanic origin.

Ancestry. As a country largely peopled by immmigrants, the United States contains within it many ancestry groups. According to the Ancestry and Language Survey conducted by the Census Bureau in November 1979, among the single ancestry groups, the Russians had the largest proportion of elderly (27.4 percent), followed by the Polish, English, and Irish (table 3-6). The high proportion of elderly in the first two of these groups is due primarily to massive migration to the United States before 1924. After that year, immigration to the United States fell off sharply because of restrictions that limited the number of immigrants. For the English and Irish, the high proportions of elderly are due primarily to low fertility since the immigrant ancestors of these groups largely arrived in the 19th century, and fertility has tended to decline in most of the subsequent years.

Among the multiple ancestry groups, "Scottish and other" had the largest proportion of elderly, and "English and other" had the next largest proportion. By contrast, "German and other" and "Irish and other," two numerically important ancestry groups, had small proportions of elderly. The large proportions of elderly among the "Scottish and other" and "English and other" ancestry groups are the result primarily of low fertility of groups whose immigrant ancestors largely arrived here more than a century ago and who have heavily intermarried.

Nativity and country of birth. The age distribution of the foreign-born population in the United States reflects the immigration policies of the past century. Before World War I, immigration from abroad was essentially unrestricted. After the war, immigration was sharply curtailed. As a result of this change in immigration policy, there is at the present time a relatively high concentration of foreign-born persons in the extreme older ages. In 1970, of all persons aged 65 and over, about 2 out of 3 (65 percent) were native of native parentage; 1 in 5 (19 percent) was native of foreign or mixed parentage, and 1 in 7 (15 percent) was foreign born (table 3-7). Of all foreign-born persons, about 1 out of 3 (32 percent) was 65 years old or over. Since 1970, aging, mortality, and additional immigration have tended to reduce these proportions.

According to the July 1975 survey and the November 1979 survey, the concentration of the foreign born among the elderly fell perceptibly after 1970. In 1975, about one-fourth of the foreign-born population was 65 years old or over, and they constituted 12 percent of this age group. Of all persons 65 years old and over in 1979, about 2 out of 3 (65 percent) were native of native parentage, nearly 1 out of 4 (23 percent) was native of foreign or mixed parentage, and only 1 out of 9 (11 percent) was foreign born. Among the foreign born, a little more than 1 out of 5 (22 percent) was 65 years old and over.

For the 9.3 million foreign-born persons (of all ages) in 1970, the leading countries of birth were Italy, Germany, Canada, and the United Kingdom (table 3-8). There is a wide variation among countries of birth in the age distribution of foreign-born persons. There are some countries for which almost half of the foreign-born population (e.g., Italy, Poland) in 1970 was 65 years of age or over, one country (USSR) for which 64 percent of the foreign-born population was 65 years old or over, and others for which only 10 percent or less (e.g., China) fell in this age band (table 3-8). Since immigrants tend to arrive when they are relatively young, these differences reflect in large part the periods during which immigrants from the various countries entered the United States, with the low proportions of foreign born in old age corresponding to immigration of a more recent period.

---

[16] The rate of gross increase is the number of persons reaching age 65 during the decade plus the number of (net) immigrants expressed as a percentage of the initial population. The rate of gross loss is the number of deaths during the decade expressed as a percent of the initial population.

[17] Hispanics may be of any race.

Ability to speak English. Older persons who speak a language other than English at home generally do not speak English as well as younger persons who speak a language other than Engish at home. In 1979, among persons 65 years and over speaking a language other than English at home, 1 in 5 did not speak English well and 1 in 10 did not speak English at all (table 3-9). Among persons of all ages who spoke a language other than English at home, only about 1 out of 5 did not speak English well or at all. The percent of the population 65 years old and over who reported "speaks English not well" and the percent who reported "speaks English not at all" exceeded the percents for the population of all ages by 4.3 percentage points and 3.5 percentage points, respectively. These data suggest that elderly persons may have greater problems in taking advantage of available services than the population in general because of their more limited facility in English. The task of service providers is made correspondingly more difficult.

Table 3-1. Sex Ratios of the Population for Broad Age Groups, by Race: 1950 to 2020

(Males per 100 females. Figures as of July 1. Figures for 1960 and later years include Armed Forces overseas)

Age and race	1950	1960	1970	1980	Projections[1]				
					1985	1990	2000	2010	2020
MIDDLE PROJECTION SERIES[2]									
All Races									
All ages	99.3	97.0	94.8	94.8	94.8	94.7	94.7	94.8	94.6
Under 15 years	103.8	103.4	103.9	104.6	104.7	104.8	104.9	104.9	104.9
15 to 29 years	98.7	97.7	97.8	101.9	102.6	103.1	103.5	103.7	103.7
30 to 44 years	97.4	95.5	95.2	96.9	98.1	98.8	100.2	100.9	101.2
45 to 59 years	99.8	96.9	93.4	92.0	92.6	93.3	94.9	96.6	97.6
60 to 64 years	100.4	91.2	87.7	86.2	85.7	86.3	87.9	90.0	92.0
65 to 69 years	94.0	87.8	80.7	80.0	80.6	80.4	82.1	84.3	86.4
70 to 74 years	91.3	85.3	73.9	72.4	72.4	73.2	74.2	76.4	78.7
75 to 84 years	85.0	77.4	65.9	58.9	59.1	59.3	60.0	61.1	64.0
85 years and over	70.0	63.8	53.2	43.7	40.1	38.6	37.2	36.3	36.0
65 years and over	89.5	82.6	72.0	67.5	66.7	66.1	64.5	65.2	69.1
75 years and over	82.6	75.0	63.3	55.2	54.1	53.5	52.5	51.2	53.3
White									
All ages	99.6	98.1	96.3	95.2	95.4	95.4	95.5	95.5	95.4
Under 15 years	104.3	104.0	104.5	105.2	105.3	105.4	105.4	105.5	105.5
15 to 29 years	99.7	101.5	102.3	102.2	103.5	103.9	104.4	104.5	104.5
30 to 44 years	98.0	97.4	97.9	98.8	100.0	100.5	101.6	102.3	102.6
45 to 59 years	99.7	96.9	93.3	93.4	94.4	95.3	97.0	98.4	99.2
60 to 64 years	100.0	91.0	87.7	86.9	86.7	88.2	90.1	92.4	94.0
65 to 69 years	94.0	87.6	80.6	80.4	81.4	81.4	84.3	86.6	88.7
70 to 74 years	90.6	84.7	73.2	72.2	72.8	73.9	75.9	78.4	80.8
75 to 84 years	84.1	76.6	65.2	58.3	58.7	59.3	60.6	62.5	65.6
85 years and over	70.0	62.9	52.1	43.0	39.4	38.1	37.1	36.5	36.6
65 years and over	89.1	82.0	71.3	67.2	66.7	66.4	65.3	66.4	70.7
75 years and over	81.9	74.2	62.6	54.5	53.6	53.3	52.8	52.0	54.4
Black									
All ages	96.5	93.8	91.8	89.6	90.5	90.7	91.2	91.7	92.1
Under 15 years	100.4	99.7	100.4	101.4	101.9	102.1	102.3	102.3	102.3
15 to 29 years	91.6	92.5	94.1	93.4	98.1	99.8	100.6	101.1	101.1
30 to 44 years	92.5	87.9	84.0	84.1	86.3	89.0	95.0	97.1	98.1
45 to 59 years	102.4	92.3	86.4	81.4	79.2	79.0	81.7	87.9	92.2
60 to 64 years	105.9	91.0	83.7	79.1	76.3	72.1	71.6	74.9	81.2
65 to 69 years	94.1	88.5	79.4	74.3	73.0	70.7	66.7	67.9	72.7
70 to 74 years	101.7	88.0	79.1	70.9	67.1	66.1	61.1	61.4	64.7
75 to 84 years	99.1	84.7	73.4	63.0	59.6	56.7	53.5	49.9	51.4
85 years and over	70.4	73.7	60.0	49.5	46.4	42.6	36.7	33.2	30.5
65 years and over	95.8	86.5	76.3	68.0	64.5	61.7	56.1	54.5	58.2
75 years and over	93.2	82.6	70.5	60.0	56.5	53.0	47.9	43.7	43.7
HIGHEST PROJECTION SERIES[3]									
All Races									
65 years and over	89.5	82.6	72.0	67.5	66.7	66.0	64.2	64.6	68.8
75 years and over	82.6	75.0	63.3	55.2	54.0	53.2	51.8	50.1	52.2
85 years and over	70.0	63.8	53.2	43.7	39.8	38.0	35.8	34.5	34.0
LOWEST PROJECTION SERIES[4]									
All Races									
65 years and over	89.5	82.6	72.0	67.5	66.7	66.2	64.7	65.5	69.0
75 years and over	82.6	75.0	63.3	55.2	54.1	53.6	52.9	51.8	53.7
85 years and over	70.0	63.8	53.2	43.7	40.0	38.9	38.1	37.5	37.3

[1] Base date of projections is July 1, 1981.

[2] Middle projection series represents medium fertility (TFR = 1.9), medium mortality, and medium immigration (annual net immigration of 450,000).

[3] Highest projection series represents high fertility (TFR = 2.3), low mortality, and high immigration (annual net immigration of 750,000).

[4] Lowest projection series represents low fertility (TFR = 1.6), high mortality, low immigration (annual net immigration of 250,000).

Source: U.S. Bureau of the Census, Current Population Reports, Series P-25, Nos. 311, 519, 614, 917, and 922.

Table 3-2. Decennial Percent Increase of the Population in the Older Ages, by Sex and, by Race: 1950 to 2020

(Periods extend from July 1 of initial year to June 30 of terminal year. A minus sign (-) denotes a decrease. See text for explanation of middle, highest, and lowest projection series; base date of projections is July 1, 1981)

Age, sex, and race	1950 to 1960	1960 to 1970	1970 to 1980	Projections			
				1980 to 1990	1990 to 2000	2000 to 2010	2010 to 2020
MIDDLE PROJECTION SERIES							
Male:							
55 to 64 years	12.6	16.7	15.2	-2.8	14.0	48.1	16.8
65 to 74 years	25.5	6.3	24.3	15.8	-1.2	16.8	48.8
75 to 84 years	34.1	19.9	17.5	32.6	19.6	0.8	20.7
85 years and over	50.6	35.8	39.3	39.5	44.5	30.2	7.1
55 years and over	20.1	14.1	19.1	9.8	10.9	28.7	25.8
65 years and over	28.8	11.4	23.2	22.1	8.6	12.8	35.5
75 years and over	36.4	22.3	21.2	33.9	24.6	7.7	16.9
Female:							
55 to 64 years	20.7	22.0	17.6	-3.3	11.7	45.0	14.4
65 to 74 years	34.5	18.7	26.0	15.0	-2.6	12.9	45.2
75 to 84 years	47.3	40.8	31.5	31.7	18.2	-1.0	15.2
85 years and over	65.4	62.9	69.5	57.7	50.0	33.7	7.8
55 years and over	30.1	25.1	25.0	12.7	11.4	24.0	22.0
65 years and over	39.6	27.9	31.2	24.8	11.3	11.6	27.8
75 years and over	50.2	44.8	39.1	38.1	27.0	10.4	12.3
White:							
55 to 64 years	14.5	18.8	15.4	-4.8	11.0	44.3	12.7
65 to 74 years	30.0	11.4	24.4	15.1	-3.9	12.9	44.7
75 to 84 years	40.4	31.2	24.0	30.9	18.2	-2.4	15.6
85 years and over	59.7	51.2	59.3	50.7	47.1	31.9	5.4
55 years and over	24.0	19.0	21.3	10.4	9.7	23.8	21.3
65 years and over	34.2	19.2	26.7	23.1	8.9	10.3	28.7
75 years and over	43.3	34.5	30.6	35.4	25.5	7.8	11.9
Black:							
55 to 64 years	45.3	25.4	18.7	4.3	17.6	59.0	36.2
65 to 74 years	29.3	27.6	28.7	10.8	7.4	20.4	50.6
75 to 84 years	49.8	34.2	45.5	39.8	16.1	11.3	23.8
85 years and over	45.3	55.2	55.3	67.5	59.0	32.6	18.9
55 years and over	40.1	28.0	26.6	14.3	16.4	36.8	39.5
65 years and over	34.8	30.9	34.9	23.3	15.5	15.3	43.0
75 years and over	49.0	38.0	47.5	45.7	26.5	17.8	22.1
HIGHEST PROJECTION SERIES							
Male:							
55 years and over	20.1	14.1	19.1	10.8	13.6	32.1	28.9
65 years and over	28.8	11.4	23.2	23.4	11.9	17.0	38.8
75 years and over	36.4	22.3	21.2	35.5	30.0	13.8	21.5
Female:							
55 years and over	30.1	25.1	25.0	13.9	14.3	27.3	24.8
65 years and over	39.6	27.9	31.2	26.3	15.1	16.2	30.3
75 years and over	50.2	44.8	39.1	40.3	33.5	17.7	16.8
White:							
55 years and over	24.0	19.0	21.3	11.2	12.1	26.8	23.7
65 years and over	34.2	19.2	26.7	24.3	12.2	14.4	31.1
75 years and over	43.3	34.5	30.6	37.4	31.3	14.2	16.1
Black:							
55 years and over	40.1	28.0	26.6	15.3	19.5	40.6	42.4
65 years and over	34.8	30.9	34.9	24.4	19.5	24.2	46.4
75 years and over	49.0	38.0	47.5	47.2	32.8	25.4	27.6
LOWEST PROJECTION SERIES							
Male:							
55 years and over	20.1	14.1	19.1	8.6	8.4	25.9	23.5
65 years and over	28.8	11.4	23.2	20.6	5.4	8.9	32.8
75 years and over	36.4	22.3	21.2	31.4	19.8	2.1	12.5
Female:							
55 years and over	30.1	25.1	25.0	11.4	8.8	21.2	20.1
65 years and over	39.6	27.9	31.2	23.1	7.8	7.6	25.9
75 years and over	50.2	44.8	39.1	35.1	21.5	4.2	8.5
White:							
55 years and over	24.0	19.0	21.3	9.3	7.3	21.2	19.4
65 years and over	34.2	19.2	26.7	21.6	5.7	6.5	26.6
75 years and over	43.3	34.5	30.6	32.8	20.4	1.9	8.1
Black:							
55 years and over	40.1	28.0	26.6	12.5	13.2	33.4	37.4
65 years and over	34.8	30.9	34.9	21.0	11.4	14.5	40.3
75 years and over	49.0	38.0	47.5	41.9	20.2	11.0	17.4

Source: U.S. Bureau of the Census, Current Population Reports, Series P-25, Nos. 311, 519, 614, 917, and 922.

Table 3-3. Percent of the Total Population in the Older Ages, by Sex and, by Race: 1950 to 2020

(Figures as of July 1. Based on the total population including Armed Forces overseas. See text for explanation of middle, highest, and lowest projection series; base date of projections is July 1, 1981)

Sex, race, and age	1950	1960	1970	1980	Projections[1]					
					1985			1990		
					Middle series	Highest series	Lowest series	Middle series	Highest series	Lowest series
MALE										
60 years and over	11.8	12.4	12.6	13.6	14.2	14.2	14.3	14.5	14.3	14.6
65 years and over	7.7	8.5	8.5	9.4	9.9	9.8	9.9	10.4	10.3	10.5
70 years and over	4.5	5.2	5.3	5.8	6.3	6.3	6.3	6.7	6.7	6.8
75 years and over	2.3	2.7	3.0	3.2	3.6	3.5	3.6	3.9	3.9	3.9
80 years and over	1.0	1.2	1.4	1.6	1.7	1.7	1.7	2.0	1.9	1.9
85 years and over	0.3	0.4	0.5	0.6	0.7	0.7	0.7	0.8	0.8	0.8
FEMALE										
60 years and over	12.5	14.1	15.6	17.8	18.8	18.8	18.9	19.4	19.2	19.5
65 years and over	8.6	10.0	11.2	13.1	14.0	14.0	14.1	14.9	14.8	15.0
70 years and over	5.2	6.3	7.5	9.0	9.9	9.8	9.9	10.6	10.5	10.6
75 years and over	2.8	3.5	4.4	5.6	6.3	6.2	6.2	7.0	7.0	7.0
80 years and over	1.3	1.6	2.3	3.0	3.5	3.5	3.5	4.0	4.0	4.0
85 years and over	0.5	0.6	0.9	1.4	1.6	1.6	1.6	1.9	2.0	1.9
WHITE										
60 years and over	12.6	13.7	14.6	16.6	17.6	17.5	17.6	18.1	17.9	18.2
65 years and over	8.4	9.6	10.2	11.9	12.8	12.7	12.8	13.6	13.5	13.6
70 years and over	5.0	6.0	6.7	7.9	8.7	8.6	8.7	9.3	9.3	9.4
75 years and over	2.7	3.3	3.9	4.7	5.3	5.3	5.3	5.9	5.9	5.9
80 years and over	1.2	1.5	1.9	2.5	2.8	2.8	2.8	3.2	3.3	3.2
85 years and over	0.4	0.5	0.7	1.1	1.3	1.3	1.3	1.5	1.5	1.5
BLACK										
60 years and over	8.2	9.2	10.1	11.1	11.3	11.2	11.3	11.3	11.2	11.4
65 years and over	5.7	6.3	6.8	7.8	8.0	8.0	8.0	8.2	8.2	8.3
70 years and over	3.0	3.7	4.1	4.9	5.4	5.3	5.4	5.6	5.5	5.6
75 years and over	1.6	1.9	2.2	2.8	3.1	3.1	3.1	3.5	3.5	3.5
80 years and over	0.8	0.9	1.1	1.4	1.6	1.6	1.6	1.8	1.8	1.8
85 years and over	0.3	0.4	0.5	0.6	0.7	0.7	0.7	0.9	0.9	0.8

Sex, race, and age	Projections[1]--Continued								
	2000			2010			2020		
	Middle series	Highest series	Lowest series	Middle series	Highest series	Lowest series	Middle series	Highest series	Lowest series
MALE									
60 years and over	14.3	14.1	14.4	16.8	16.3	17.1	21.2	20.0	22.1
65 years and over	10.5	10.4	10.6	11.2	11.1	11.3	14.6	14.0	15.0
70 years and over	7.4	7.3	7.4	7.4	7.3	7.3	9.2	9.0	9.3
75 years and over	4.6	4.6	4.5	4.7	4.7	4.5	5.2	5.2	5.1
80 years and over	2.4	2.4	2.3	2.7	2.8	2.6	2.8	2.9	2.6
85 years and over	1.1	1.1	1.0	1.3	1.4	1.2	1.3	1.5	1.2
FEMALE									
60 years and over	19.5	19.3	19.7	22.1	21.7	22.5	26.7	25.4	27.8
65 years and over	15.5	15.4	15.5	16.4	16.2	16.4	20.0	19.3	20.5
70 years and over	11.8	11.9	11.8	12.0	12.1	11.8	14.1	13.9	14.1
75 years and over	8.3	8.4	8.1	8.6	9.0	8.3	9.3	9.5	8.9
80 years and over	5.1	5.3	4.8	5.9	6.3	5.4	5.9	6.4	5.4
85 years and over	2.7	2.9	2.5	3.4	3.9	3.0	3.5	4.2	3.0
WHITE									
60 years and over	18.1	17.9	18.2	20.8	20.4	21.1	25.5	24.4	26.6
65 years and over	14.0	14.0	14.0	14.9	14.8	14.9	18.6	18.0	19.0
70 years and over	10.4	10.5	10.4	10.5	10.6	10.3	12.7	12.5	12.7
75 years and over	7.0	7.1	6.9	7.3	7.5	7.0	7.9	8.1	7.6
80 years and over	4.1	4.3	3.9	4.7	5.1	4.4	4.7	5.1	4.3
85 years and over	2.1	2.2	1.9	2.6	3.0	2.3	2.7	3.2	2.3
BLACK									
60 years and over	11.3	11.1	11.3	12.9	12.6	13.1	16.9	16.1	17.6
65 years and over	8.4	8.3	8.4	8.9	8.8	8.9	11.6	11.1	11.8
70 years and over	6.0	6.0	5.9	6.1	6.2	6.0	7.4	7.3	7.4
75 years and over	3.9	3.9	3.8	4.1	4.2	3.9	4.5	4.6	4.4
80 years and over	2.3	2.3	2.2	2.6	2.7	2.4	2.7	2.9	2.5
85 years and over	1.2	1.3	1.1	1.4	1.6	1.2	1.5	1.7	1.3

[1] Percents for the highest and lowest projection series do not represent a range (i.e., uncertainty interval) around the percents for the middle series. See text of chapter 2 for explanation.

Source: U.S. Bureau of the Census, Current Population Reports, Series P-25, Nos. 311, 519, 614, 917, and 922.

Table 3-4. Age at Which Average Years of Remaining Life Equals 10 and the Percentage of Total Population Above This Age, by Sex and Race: 1920 to 1980

Year	Total	White		Black and other races[1]	
		Male	Female	Male	Female
	Age at which average remaining lifetime equals 10 years				
1920	[2]69.4	69.4	69.9	69.1	70.6
1930	69.1	68.4	70.0	67.0	71.1
1940	70.0	68.8	70.9	70.3	74.5
1950	71.7	70.1	72.9	71.9	75.4
1960	72.5	70.6	73.8	72.2	75.2
1970	73.7	70.8	75.4	71.8	77.5
1978	75.8	72.2	77.6	74.0	84.7
1980[3]	75.9	(NA)	(NA)	(NA)	(NA)
	Percent of population above specified age				
1920	2.9	2.9	2.9	2.1	1.7
1930	3.5	3.9	3.4	2.6	1.6
1940	4.0	4.6	3.9	2.4	1.4
1950	3.9	4.6	3.9	2.4	1.5
1960	4.2	5.1	4.3	2.6	2.0
1970	4.4	5.1	4.5	3.2	1.9
1978	3.8	4.6	4.2	2.5	1.1
1980	4.0	(NA)	(NA)	(NA)	(NA)

NA Not available.

[1] Data for 1920, 1930, and 1940 pertain to Blacks only.
[2] Death Registration States of 1920.
[3] Provisional.

Source: Various official U.S. life tables. Population data for calculating percents of population are from Census of Population, 1930, and Current Population Reports, Series P-25, Nos. 311, 519, and 870.

Table 3-5. Estimates of the Demographic Components of Change in the Population 65 Years and Over, by Sex and Race: 1970-80 and 1960-70

(Numbers in thousands. Figures from 1980 and 1970 censuses have been adjusted for the "misclassification" of persons of Spanish origin as Black and other races rather than White. In addition, figures from the 1970 census have been adjusted for the overstatement of the number of centenarians)

Item and period	White		Black and other races[1]		Item and period	White		Black and other races[1]	
	Male	Female	Male	Female		Male	Female	Male	Female
JULY 1, 1970, TO JULY 1, 1980					APRIL 1, 1960, TO APRIL 1, 1970				
Population 65 years and over, 1980	9,358	13,932	852	1,252	Population 65 years and over, 1970	7,615	10,657	752	949
Population 65 years and over, 1970	7,655	10,734	674	885	Population 65 years and over, 1960	6,908	8,396	595	661
Net increase	1,703	3,198	178	367	Net increase	707	2,261	157	288
Number reaching age 65	7,321	8,769	715	916	Number reaching age 65	6,044	7,009	636	699
Net "migrants" 65 years and over	-	5	3	7	Net "migrants" 65 years and over	22	38	3	5
Deaths 65 years and over	5,687	5,653	524	507	Deaths 65 years and over	5,254	4,848	468	409
Deaths to initial population 65 years and over	4,433	4,809	392	415	Deaths to initial population 65 years and over	4,115	4,127	310	281
Deaths to persons reaching age 65	1,254	844	132	93	Deaths to persons reaching age 65	1,139	721	158	128
Gross change[2]	13,007	14,427	1,242	1,430	Gross change[2]	11,320	11,895	1,107	1,113
Rate of gross gain[3]	95.6	81.7	106.5	104.2	Rate of gross gain[3]	87.8	83.9	107.4	106.5
Rate of gross loss[3]	74.3	52.7	77.7	57.3	Rate of gross loss[3]	76.1	57.7	78.7	61.9
Population 65 to 74 years as percent of population 65 years and over, 1980	65.4	57.3	66.7	62.3	Population 65 to 74 years as percent of population 65 years and over, 1970	64.7	59.8	68.5	66.2
Ratio, net change to gross change[2]	.131	.222	.143	.256	Ratio, net change to gross change[2]	.062	.192	.158	.273
Mortality rate of population 65 years and over[4]	38.0	29.0	37.7	28.2	Mortality rates of population 65 years and over[4]	40.6	31.5	38.0	30.1
Mortality rate of initial population 65 years and over[3]	57.9	44.8	58.2	46.9	Mortality rate of initial population 65 years and over[3]	59.6	49.2	52.1	42.5
Mortality rate for persons reaching age 65[5]	17.1	9.6	18.5	10.1	Mortality rate for persons reaching age 65[5]	18.8	10.3	24.8	18.3

- Represents zero.

[1] Black only for the 1970-80 period.
[2] Gross change represents the sum of persons reaching age 65, net migrants, and deaths 65 years and over. It does not include the "error of closure," the residual (4.8 million for all classes, 1970-80, and 0.3 million for 1960-70), representing the difference between net increase based on the census counts and the net change based on the components of change. "Net increase" in the table represents the difference between census counts, including the "error of closure."
[3] Per 100 initial population 65 years and over.
[4] Per 100 initial population 65 years and over plus persons reaching age 65 during the decade.
[5] Per 100 persons reaching age 65 during the decade.

Source: Population data are from Census of Population for 1980, 1970, and 1960, and statistics on the number reaching age 65, mortality, and migration are from unpublished Bureau of the Census records.

Table 3-6. Percent of the Population in the Older Ages, for Specified Ancestry Groups: 1979

(Numbers in thousands)

Ancestry	All ages		55 years and over	55 to 64 years	65 years and over
	Number	Percent			
Single ancestry	96,496	100.0	24.9	11.2	13.6
German	17,160	100.0	26.4	11.6	14.8
English	11,501	100.0	30.6	12.7	17.9
Irish	9,760	100.0	29.0	12.7	16.3
Afro-American, African	15,057	100.0	14.1	6.9	7.3
Italian	6,110	100.0	32.4	16.2	16.3
Polish	3,498	100.0	37.5	18.4	19.2
Spanish (including, Latin American)	9,762	100.0	9.7	5.1	4.6
Russian	1,496	100.0	42.4	15.0	27.4
French	3,047	100.0	25.4	12.3	13.1
All other	19,105	100.0	28.1	12.5	15.6
Multiple ancestry groups[1]	82,582	100.0	15.6	7.9	7.7
Irish and other	33,992	100.0	17.6	8.7	8.9
English and other	28,503	100.0	19.1	9.4	9.7
German and other	34,489	100.0	12.9	6.7	6.2
Scottish and other	12,590	100.0	25.2	11.8	13.4

[1] Multiple ancestry groups are not mutually exclusive.

Source: U.S. Bureau of the Census, Current Population Reports, Series P-23, No. 116, March 1982.

Table 3-7. Percent Distribution of the Total Population and the Population 45 Years and Over by Nativity and Parentage, and Percent of the Native and Foreign-Born Populations in the Older Ages: 1979 and 1970

Nativity and parentage	All ages	45 to 54 years	55 to 64 years	65 years and over	75 years and over
DISTRIBUTION BY NATIVITY AND PARENTAGE					
1979					
Total[1]	100.0	100.0		100.0	100.0
Native of native parentage	80.4	74.5		65.2	(NA)
Native of foreign or mixed parentage	10.9	19.3		23.3	(NA)
Foreign born	5.4	6.2		11.4	(NA)
1970					
Total	100.0	100.0	100.0	100.0	100.0
Native of native parentage	83.5	73.5	69.8	65.3	64.0
Native of foreign or mixed parentage	11.8	21.4	22.5	19.4	18.3
Foreign born	4.7	5.1	7.7	15.3	17.7
DISTRIBUTION BY AGE					
1979					
Native	100.0	19.8		10.1	(NA)
Foreign born	100.0	22.1		22.0	(NA)
1970					
Native	100.0	11.4	8.9	8.8	3.3
Foreign born	100.0	12.1	14.9	32.0	14.1

[1] Includes persons not reporting nativity.

Source: U.S. Bureau of the Census, Current Population Reports, P-23, No. 116, March 1982, and Census of Population: 1970, Subject Reports, Final Report, PC(2)-1A, 1973.

Table 3-8. Percent of the Foreign-Born Population in the Older Ages, for Specified Countries of Birth: 1970

(Numbers in thousands)

Country of birth	All ages		55 years and over	55 to 64 years	65 to 74 years	75 years and over	65 years and over
	Number	Percent					
All countries[1]	9,619	100.0	46.9	14.9	17.9	14.1	32.0
United Kingdom	686	100.0	49.5	15.2	19.4	14.9	34.3
Germany	833	100.0	45.2	15.1	17.7	12.4	30.1
Poland	548	100.0	69.3	20.4	24.4	24.5	48.9
U.S.S.R.	463	100.0	84.6	20.7	37.4	26.5	63.9
Italy	1,009	100.0	63.6	16.9	25.3	21.4	46.7
Canada	812	100.0	42.6	18.1	14.4	10.1	24.5
Latin America	1,804	100.0	20.2	9.9	7.0	3.2	10.3
All other countries	3,464	100.0	48.1	14.4	18.2	15.6	33.8

[1] Includes "not reported," not shown separately.

Source: U.S. Bureau of the Census, Census of Population: 1970, Subject Reports, Final Report PC(2)-1A, 1973, table 10.

Table 3-9. Ability to Speak English for Persons 65 Years and Over and for Persons of All Ages Who Speak a Language Other Than English at Home: 1979

(Numbers in thousands)

Age and ability to speak English	Number	Percent
65 YEARS AND OVER		
Total persons	2,434	100.0
Speak English very well or well	1,722	70.8
Speak English not well	475	19.5
Speak English not at all	238	9.8
ALL AGES		
Total persons	17,985	100.0
Speak English very well or well	14,109	78.4
Speak English not well	2,739	15.2
Speak English not at all	1,137	6.3

Source: U.S. Bureau of the Census, *Ancestry and Language*, Current Population Reports, Series P-23, No. 116, March 1982.

Chapter 4.
Geographic Distribution and Residential Mobility

DIVISIONS, STATES, AND COUNTIES

Numbers of older persons. Elderly persons tend to be most numerous in the largest States, of course. California and New York have the largest number of people over age 65, with more than 2 million each in 1980 (table 4-1). They are followed by Florida, Pennsylvania, Texas, Illinois, and Ohio. Each of these five States has over a million people over age 65. Together these seven States account for about 45 percent of the population in this age range in the United States. This proportion is not unlike the proportion of the population of all ages in these seven States (44 percent).

In all States, the number of persons 65 years and over increased between April 1, 1970, and April 1, 1980.[18] Rapid growth of the number of elderly persons occurred between 1970 and 1980 in Arizona, Florida, Nevada, New Mexico, South Carolina, Alaska, and Hawaii. Each of these States experienced a gain of over 50 percent over its 1970 population 65 years and over, as compared with 28 percent for the entire country. Other States with high growth rates (over 35 percent) in the 1970-80 period are Delaware, Tennessee, Alabama, Texas, Georgia, North Carolina, Utah, Virginia, and Idaho. Florida added 700,000, California, 623,000, and Texas, 384,000. Since California has nearly twice the population of Florida, its growth rate was far smaller (35 percent) than Florida's.

Slow growth (under 15 percent) was experienced by Massachusetts, New York, Iowa, Missouri, South Dakota, Nebraska, Kansas, and the District of Columbia. All four geographic divisions in the North had growth rates well below the national average, and all five divisions of the South and West, especially the South Atlantic Division and the Mountain Division, had growth rates above the national average (28 percent). The patterns of percentage changes were roughly similar in the 1970-80 period and the 1960-70 period. The percents are generally larger in the more recent period, however.[18]

Proportion of older persons. In 1980, the proportion of elderly persons in the States varied from 2.9 percent (Alaska) to 17.3 percent (Florida), but the figures for most States fell within 2 percentage points of the national average (11.3 percent). Some midwestern States, constituting much of the midwestern farm belt, namely Iowa, Kansas, Missouri, Nebraska, South Dakota, and Arkansas, as well as Maine, Massachusetts, Rhode Island, and Pennsylvania, show high proportions (i.e., 12.5 percent or more) of elderly persons in 1980 (table 4-2 and figure 4-1). Continued heavy recent out-migration of young persons and relatively low fertility are the factors that have contributed to the relatively large proportions of older persons in these States. Attracted by the favorable climate, the more "affluent" elderly have been migrating to retirement homes in Florida and Arizona. The effect of the heavy immigration in the years prior to World War I has by now almost completely worn off except in a few States (e.g., New York, Connecticut, and, indirectly, Florida).

States with low proportions (e.g., under 9.5 percent) of elderly persons in 1980 are located mainly in the South and West. The list includes several States which have relatively high fertility (i.e., South Carolina, Georgia, New Mexico, Utah, and Wyoming), several States which have been experiencing a large net inmigration of persons well under age 65 (i.e., Maryland, Virginia, Nevada, and Colorado), and the outlying States of Alaska and Hawaii.

Counties show a much wider variation in the proportion of elderly persons than States. Many counties with extremely high proportions of persons 65 and over may be found in the West North Central Division and the West South Central Division.[19] Over one-quarter of the counties in Kansas and over one-fifth of the counties of Texas and Missouri had proportions of 20 percent or more in 1980 (the U.S. average being 11.3 percent). In over half of the 619 counties in the West North Central Division and in over 40 percent of the 470 counties in the West South Central Division, 15 percent or more of the population was 65 years old or over in 1980. In six Midwestern States (Arkansas, Iowa, Missouri, Nebraska, Kansas, and Oklahoma), roughly half or more of the counties had proportions in excess of 20 percent over age 60 (the U.S. average being 15.7 percent).

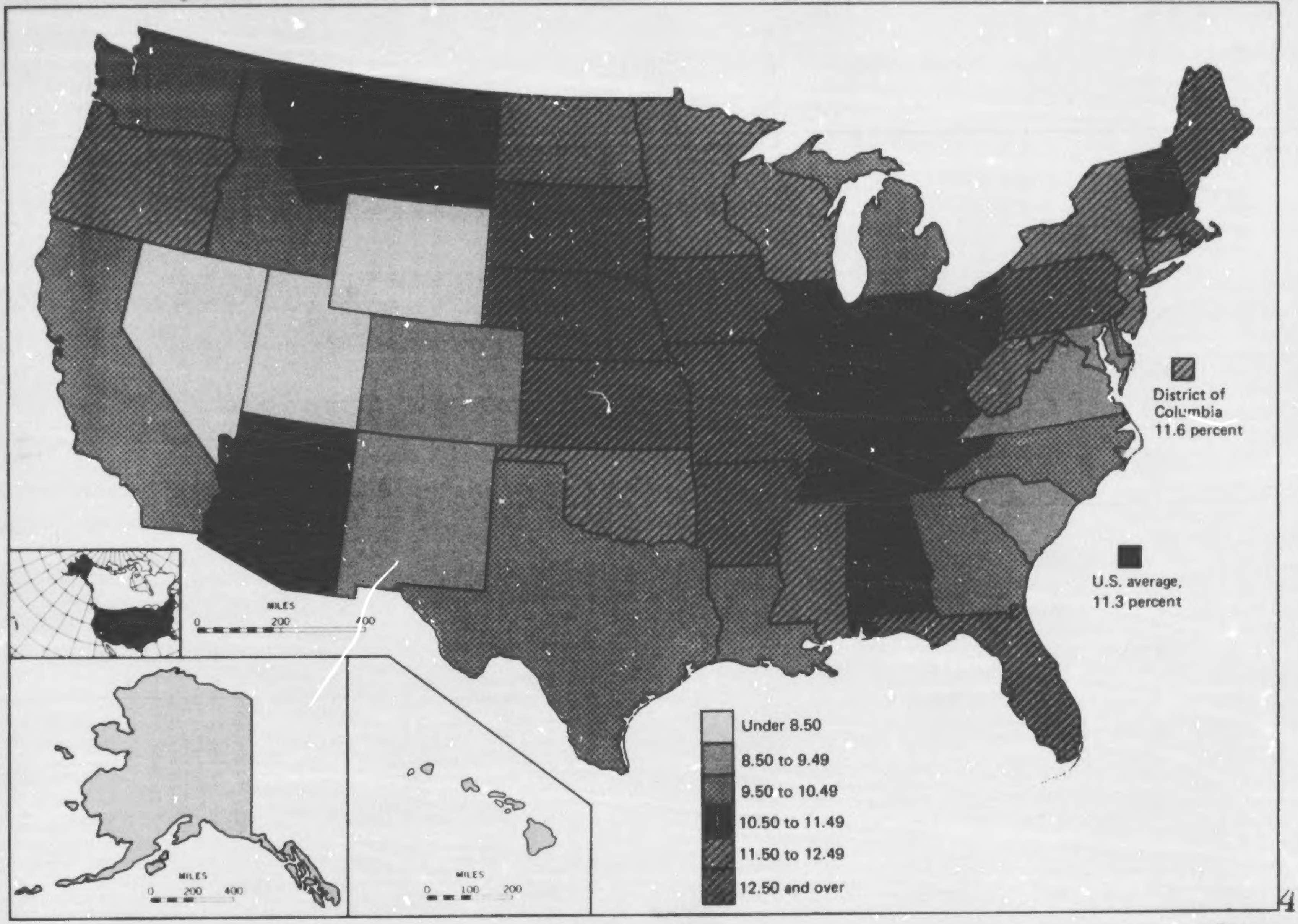
With its large retired population, Florida is a special case among the States and in its geographic division. In 1980, over one-fifth of the counties in that State had proportions of 20 percent or more over age 65, and several counties had in excess of 30 percent (e.g., Charlotte County with 34 percent).

---

[18] The amounts and rates of population growth for States, 1970 and 1980, and the identification of States with amounts and rates of population growth exceeding specified levels, are affected by the apparently much greater completeness of coverage of the population in the 1980 census than in the 1970 census.

[19] See Administration on Aging, DHEW Publication No. (OHDS) 78-20248, "The Elderly Population: Estimates by County, 1977," and U.S. Bureau of the Census, 1970 Census, United States Maps, GE-50, No. 36, "Older Americans by Counties of the United States, 1970;" and U.S. Bureau of the Census, *General Population Characteristics*, PC80-1B.

FIGURE 4-1. Percentage of the Total Population 65 Years and Over, for States: 1980


District of Columbia 11.6 percent
U.S. average, 11.3 percent
MILES
0
200
400
MILES
0
200
400
MILES
0
100
200
Under 8.50
8.50 to 9.49
9.50 to 10.49
10.50 to 11.49
11.50 to 12.49
12.50 and over

There is a close correlation between the proportion of the population of a county that is over ages 60 or 65 and the year the county reached its maximum population. The earlier the maximum population was reached the higher the percentage. Many counties with large percentages of elderly not only are not gaining population through net in-migration but are showing a natural decrease (excess of deaths over births).

Role of internal migration. Estimates of net migration for States between 1970 and 1980 for the age group 65 and over (i.e., persons migrating at age 65 or over) were developed especially for this study.[20] Estimates of this type were prepared on the assumption that they are more useful for many gerontological studies than estimates of the volume of net migration for the age cohort 65 and over during a decade or a quinquennium (e.g., a cohort 65 and over in 1980 and 55 and over in 1970, or 65 and over in 1980 and 60 and over in 1975), which is the type of figures secured in the decennial census and sample surveys. Estimates of net migration for States between 1960 and 1970 for the age cohort 65 and over in 1965 (i.e., 60 and over in 1960 and 70 and over in 1970) and between 1970 and 1980 for the age cohort 65 and over in 1975 (i.e., 60 and over in 1970 and 70 and over in 1980) are presented for comparison.[21] Net migration for each of these cohorts should roughly approximate net migration for the age group 65 and over during the corresponding decade.

The estimates of net migration for 1970-80 reflect a considerable movement of elderly persons out of the Middle Atlantic States and the East North Central States and into the West and the South, especially the South Atlantic States, during this period (tables 4-3 and 4-4). New York, Pennsylvania, Illinois, and Michigan were big losers, and Florida, Texas, Arizona, and California were big gainers. In relative terms, New York, the District of Columbia, and Alaska were the largest losers, and Florida, Nevada, and Arizona were the largest gainers. To a large extent, but for different reasons, the elderly population moved in the same directions as the general population during the 1970-80 decade.[22]

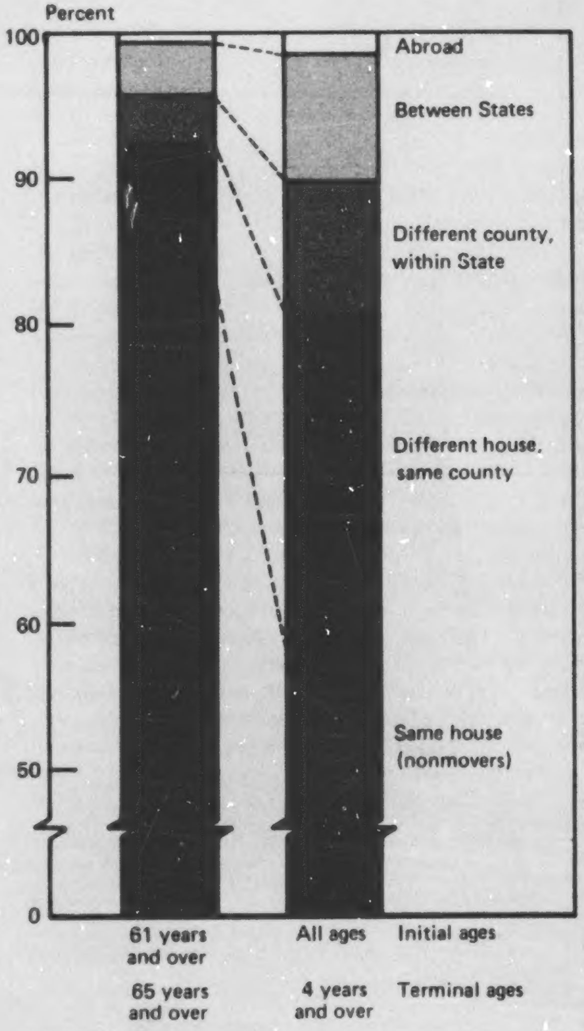
The migration patterns during the 1960's were similar to those during the 1970's (table 4-5). There were major losses through net out-migration in the Middle Atlantic Division and the East North Central Division and major gains through net in-migration in the South Atlantic Division, the West South Central Division, and the Pacific Division.

PATTERNS OF RESIDENTIAL MOBILITY

In spite of the fact that several States showed relatively high net in- or out-migration rates for the elderly population between 1960 and 1970 and between 1970 and 1980, this age group moves relatively little. In the years 1975-79, the rate of interstate migration for persons 65 and over was 3.6 percent, or only two-fifths as great as the interstate migration rate for the entire population 4 years old and over (8.1 percent). (See table 4-5 and figure 4-2.) Similar differences appeared for other classes of movers, such as intercounty and interregional migrants, and for each sex.

FIGURE 4-2.

Mobility and Migration Status of the Population 65 Years and Over and 4 Years and Over in 1979: 1975-79



Source: Table 4-5.

---

[20] These estimates were derived by subtracting direct estimates of "natural increase" for ages 65 and over during the decade (the number of persons reaching age 65 minus the number of deaths of persons 65 and over during the decade) from the net change in the number of persons 65 and over during the decade. See appendix C for a detailed description of the methodology.

[21] For this purpose also, a residual method was employed. National census survival rates (rather than death statistics or life table survival rates) were used to allow for mortality. See appendix C for a detailed description of the methodology.

[22] See N.W. Rives and W. J. Serow, "Interstate Migration of the Elderly: Demographic Aspects," *Research on Aging*, Vol. 3, No. 2, June 1981, pp. 259-278.

Mobility rates and migration rates exhibit a generally downward progression with advancing age from age group 20 to 24 on, as may be seen from data for the years 1975-76 (1-year period) and 1975-79 (4-year period) in table 4-6.[23] Not only has this been the pattern at least for the last few decades but the rates themselves have varied very little. Mobility rates seem to rise in some years around age 75 as a result, possibly, of institutionalization, changes in marital and household status, and movement to and from retirement centers.

SIZE OF PLACE AND TYPE OF RESIDENCE

The 1970 census showed a general gradation in the proportion of persons 65 and over according to the size of the place of residence, excluding the farm population ("other rural" areas) and the urban fringe; the larger the place, the lower the percentage of elderly people. The highest proportion of elderly persons (13.6 percent) was found in small towns, i.e., rural places of 1,000 to 2,500 inhabitants (table 4-7). The next highest proportion was found in urban places of 2,500 to 10,000 inhabitants (12.2 percent), followed in order by urban places of 10,000 to 50,000, central cities of urbanized areas, "other rural" areas (9.6 percent), and the urban fringe (7.8 percent). In the urban fringe, young families with children predominate.

The high percentage of elderly persons in rural places of 1,000 to 2,500 inhabitants results largely from the high rate of out-migration of young people from these places. We would expect this reason to apply also to the "other rural" areas, but other factors, working in the opposite direction and reducing the percentage of elderly persons, are presumably dominant. A higher birth rate in the farm population may account for some of the difference between the two residence categories. Perhaps of equal, if not greater, importance is the tendency of many farmers over age 65 who can no longer operate their farms to take up residence in a town close to their farm.

Over half (55 percent) of the 20.1 million persons 65 and over in April 1970 lived in urbanized areas. Of this group, about three-fifths (62 percent) lived in central cities, and two-fifths (38 percent) lived in the urban fringe. Thus, about one-third (34 percent) of all elderly persons lived in central cities, and about one-fifth (21 percent) lived in the urban fringe. Less than one-fifth lived in other urban areas (18 percent), and about one-quarter (27 percent) lived in rural areas.

Current data on the urban-rural distribution of the elderly population cannot be secured. There are data, however, for 1980 as well as for 1970 and intermediate years on the distribution of the elderly population between metropolitan and nonmetropolitan areas, with some detail for the size of the area (following the 1970 definition of metropolitan areas). These data show a progression from high to low percentages of elderly persons according to the "size" of the nonmetropolitan area, nonmetropolitan counties with no place over 2,500 population having an especially high percentage (13.5 percent) and the parts of larger metropolitan areas outside the central cities having an especially low percentage (8.9 percent) (table 4-8).

The percent of Black elderly showed the same general pattern of variation by type of residence as the White elderly. The urban-rural distribution of elderly Blacks differs from that for the elderly White population, however, principally in their much greater concentration in central cities within urbanized areas. Of the 1.6 million Blacks 65 and over in 1970, about 950,000, or three-fifths (61 percent), lived in urbanized areas. Of the latter group, 86 percent lived in central cities, and 14 percent lived in the urban fringe. Thus, over half (52 percent) of all Blacks 65 and over lived in a central city. About one-quarter (24 percent) lived in rural areas, mostly on farms.

The progression of the percentage of elderly from high to low according to the size of the metropolitan and nonmetropolitan area is more regular and sharper for Blacks than for Whites. The percent for the "small" nonmetropolitan areas in 1980 (16 percent) was three times that for the part of the larger metropolitan areas outside central cities (5 percent).

The proportions of elderly among the Hispanic population are consistently low in all residence categories, well below those for Whites and Blacks.[24] The relatively small Hispanic population 65 and over is very largely an urban population (86 percent in 1970), much more urban than the White or Black populations of these ages. Like the Black population, the Hispanic population is heavily concentrated in central cities of urbanized areas (51 percent in 1970), but unlike the Black population, a substantial share lives in the urban fringe (20 percent vs. 9 percent). Similarly, the 1980 and 1970 data on the metropolitan-nonmetropolitan distribution of the Hispanic population indicates a heavy concentration of Hispanics in metropolitan areas (82 percent in 1980), a much greater concentration than for Blacks (68 percent in 1980). The difference arises largely from the greater proportion of Hispanics than Blacks living in metropolitan areas outside central cities.

GERONTIC ENCLAVES

Analysis of data on age for census tracts in large central cities shows that there is great geographic variation in the proportion of elderly within cities, reflecting substantial residential clustering of the elderly in such cities.[25] For example, the proportion 65 years and over in the census tracts of the District of Columbia in 1980 varied from 0.3 percent to 60 percent, as compared with 11.6 percent for the entire city. Seventeen out of the 178 census tracts (excluding two with populations under 100) in the District of Columbia had in excess of 20 percent of their populations "over 65" in 1970. The index of dissimilarity between the geographic distributions of persons under 65 and persons 65 and over, calculated on the basis of data for census tracts, for the District of Columbia in 1980, is 24.2. This index indicates that the percentage distribution of the population 65 and over by census tracts would have to be shifted by 24.2 percentage points up (for positive differences) and down (for negative differences) to make it agree with that of the population under 65 years.[26]

---

[23] As suggested earlier, mobility rates and migration rates for age cohorts for a span of calendar years, defined by the terminal ages, may not represent the migration experience at these ages satisfactorily because migration at younger ages is included. For example, migration rates for the terminal ages 65-69 over a 5-year time period encompass movements of persons who were aged 60-64 at the beginning of the period, i.e., movements of many persons before retirement. Moreover, migration rates for 5-year periods tend to understate the volume of migration during the period because they do not incorporate multiple moves and, in particular, do not count multiple moves involving a return to the original residence. Therefore, rates for 1-year time periods, particularly a series of 1-year rates for several years, are preferable for analysis of mobility and migration for age groups. The last 1-year time period for which national mobility and migration rates for age groups are available is 1975-76.

[24] Hispanics may be of any race.

A similar picture of residential clustering of the elderly in specific parts of large cities emerges from an analysis of census tract data for other large cities. In Cleveland, for example, 20 of 196 census tracts have populations with 20 percent or more over 65, and the index of dissimilarity is 19.3. (The index of age dissimilarity calculated on the basis of State data in 1980 is 6.8, a figure suggesting much less clustering of the elderly than the figure for the District of Columbia or Cleveland.) The data do not suggest that the bulk of urban elderly reside in elderly enclaves to the degree that urbanites of the major racial groups and Hispanics cluster in racial/ethnic enclaves. They suggest only that there is a notable concentration of older people in some parts of large cities and a notable deficit of older people in other parts.

The principal factors which account for the concentration of older persons in specified census tracts include low income, which prevents or inhibits desired outmigration, voluntary decisions to stay in the same areas with friends and neighbors of the same social/ethnic background and age group, and movement from the suburbs or other parts of the city of older persons to those areas, after dissolution of family or sale of home, for reasons of income, social convenience, or compatability with the population and environment.[27]

In addition to reflecting growth of central city enclaves between 1970 and 1980, the 1980 census data should begin to show the emergence of gerontic enclaves in suburban metropolitan America. The post-World War II pioneer settlers in suburban areas are moving into the older years, and although some are returning to central cities and apartment living, many are remaining behind to form clusters of elderly persons in suburban areas.[28] As the family grows older, the young members leave the parental family to work and attend school elsewhere, and the oldsters may remain behind in their old neighborhoods. Measurement of the "natural" concentrations may be confused by the "artificial" concentrations in congregate housing, retirement villages, and nursing homes, but even after these artificial concentrations are removed from any analysis, evidence of gerontic enclaves is expected to remain.

SUMMARY NOTE ON MIGRATION

The following generalizations would seem to describe the current migration tendencies of the elderly population in the United States. Their migration rates are relatively low both in an "absolute" sense and in comparison with those for younger age groups; with increasing age, people migrate less. If the elderly do migrate, they generally go to various retirement areas within the United States, particularly Florida, to rural places or small towns (moving off farms), the country of origin (if foreign-born), or other areas abroad (e.g., Mexico) to retire. More commonly, many remain stuck in rural hinterlands or large urban centers, particularly the deteriorated parts of these areas, where they have spent much or all of their adult lives.

---

[25] J.M. Kennedy and Gordon F. DeJong, "Aged in Cities: Residential Segregation in 10 U.S.A. Central Cities," *Journal of Gerontology*, Vol. 32, No. 2, pp. 197-202, 1977.

Donald M. Cowgill, "The Future Location of the Elderly Population Within Metropolitan Areas," pp. 200-206 in: *Consequences of Changing U.S. Population: Demographics of Aging*, Joint Hearings before the Select Committee on Population and the Select Committee on Aging, U.S. House of Representatives, Vol. 1, No. 9, May 24, 1978;

———, "Residential Segregation by Age in American Metropolitan Areas," *Journal of Gerontology*, Vol. 33, No. 4, pp. 446-453, 1978.

[26] The index of dissimilarity is a summary measure of the difference between 2 percent distributions, calculated as one-half of the sum of the differences taken without regard to sign between the paired elements in the distributions. Note that the index of dissimilarity is affected by the number of class intervals in the distribution.

[27] Stephen M. Golant, "The Residential Location and Spatial Behavior of the Elderly," University of Chicago, Department of Geography Research Paper No. 143,1972. Cowgill, "The Future Location of the Elderly Population..." *op. cit.*

[28] Stephen M. Golant, (ed.), *Location and Environment of Elderly Population*, Washington, D.C., V. H. Winston; 1979, Michael Gutowski and Tracey Feild, ***The Graying of Suburbie***, Urban Institute, Washington, D.C., 1979.

Table 4-1. Change in the Total Population 65 Years and Over, 1970-80 and 1960-70, in the Black and Hispanic Populations 65 and Over, 1970-80, and in the Population 75 and Over, 1970-80, for Regions, Divisions, and States

(Numbers in thousands. Figures relate to April 1 or decades from April 1 to April 1)

Region, division, and State	All classes, 65 and over					Black, 65 and over		Hispanic, 65 and over		All classes, 75 and over	
	Population		Increase, 1970-80		Percent increase, 1960-70	Popula-tion 1980	Percent increase, 1970-80	Popula-tion 1980	Percent increase, 1970-80	Popula-tion 1980	Percent increase, 1970-80
	1980	1970	Amount	Percent							
United States	25,544	19,972	5,572	27.9	20.6	2,089	35.3	709	85.4	9,967	32.4
Regions:											
Northeastern States	6,072	5,176	896	17.3	15.1	346	40.7	116	280.1	2,409	24.5
North Central States	6,691	5,703	989	17.3	12.3	378	34.7	46	102.1	2,735	21.5
The South	8,484	6,014	2,470	41.1	31.2	1,228	31.2	287	102.9	3,174	46.8
The West	4,298	3,080	1,217	39.5	28.3	137	68.7	260	38.6	1,649	39.5
Northeast:											
New England	1,520	1,264	256	20.3	12.7	26	42.1	11	129.6	625	25.1
Middle Atlantic	4,551	3,911	640	16.4	15.8	320	40.6	105	308.2	1,784	24.3
North Central:											
East North Central	4,493	3,793	699	18.4	13.0	314	39.3	35	102.9	1,787	21.9
West North Central	2,199	1,909	289	15.2	11.0	64	15.9	10	99.5	948	20.7
South:											
South Atlantic	4,363	2,922	1,441	49.3	39.2	614	41.9	115	190.6	1,603	55.9
East South Central	1,657	1,263	393	31.1	20.1	297	22.2	11	579.3	626	34.9
West South Central	2,463	1,828	635	34.8	27.8	317	21.7	161	60.8	944	40.9
West:											
Mountain	1,060	692	368	53.3	31.3	14	56.1	72	35.8	389	49.1
Pacific	3,237	2,389	849	35.5	27.5	123	70.5	188	39.7	1,260	36.9
New England:											
Maine	141	114	27	23.5	6.7	(Z)	(B)	(Z)	(B)	59	29.1
New Hampshire	103	78	25	31.9	14.8	(Z)	(B)	(Z)	(B)	41	35.1
Vermont	58	47	11	22.9	7.6	(Z)	(B)	(Z)	(B)	24	29.0
Massachusetts	727	633	93	14.7	10.7	13	37.2	5,153	142.8	306	20.5
Rhode Island	127	104	23	22.2	15.4	2	9.5	1,039	(B)	51	29.6
Connecticut	365	288	77	26.9	18.3	11	55.0	3,960	91.9	145	28.9
Middle Atlantic:											
New York	2,161	1,951	209	10.7	15.6	166	48.6	76,958	233.8	868	23.0
New Jersey	860	694	166	24.0	23.8	58	44.4	20,589	947.8	329	29.8
Pennsylvania	1,531	1,267	265	20.9	12.2	96	26.9	7,516	966.8	587	23.3
East North Central:											
Ohio	1,169	993	176	17.8	10.7	84	30.5	5,922	116.1	463	19.2
Indiana	585	492	94	19.1	10.2	30	32.8	3,642	127.9	235	21.9
Illinois	1,261	1,089	172	15.8	11.7	110	39.2	16,966	97.9	500	20.2
Michigan	912	749	163	21.8	17.4	83	50.3	6,565	80.4	356	26.0
Wisconsin	564	471	94	19.9	16.8	7	68.4	2,259	158.8	234	25.4
West North Central:											
Minnesota	480	407	72	17.7	15.1	3	27.3	1,495	168.9	209	25.5
Iowa	387	349	38	11.0	6.1	3	16.9	1,469	118.0	173	16.3
Missouri	648	558	90	16.1	11.0	46	16.6	3,516	115.3	267	20.9
North Dakota	80	66	14	21.6	12.1	(Z)	(B)	(Z)	(B)	33	23.4
South Dakota	91	80	11	13.4	11.5	(Z)	(B)	(Z)	(B)	41	21.5
Nebraska	206	183	23	12.6	11.4	3	22.5	1,104	89.4	92	18.2
Kansas	306	265	41	15.4	10.6	10	8.5	2,618	54.2	133	19.9
South Atlantic:											
Delaware	59	44	16	35.8	21.2	7	41.2	(Z)	(B)	23	37.4
Maryland	396	298	97	32.7	31.4	58	47.9	3,098	101.0	148	39.8
District of Columbia	74	70	4	5.5	1.9	43	45.0	968	26.0	28	10.1
Virginia	505	364	141	38.7	26.0	87	35.2	3,653	199.4	187	42.8
West Virginia	238	194	44	22.8	12.0	10	0.5	1,403	(B)	91	24.5
North Carolina	602	412	190	46.2	32.0	124	44.2	3,655	(B)	215	50.2
South Carolina	287	190	97	51.1	25.7	77	44.4	2,000	(B)	98	51.5
Georgia	517	365	151	41.5	25.5	119	35.9	3,764	323.9	186	42.8
Florida	1,685	985	700	71.0	78.2	101	52.5	95,579	183.5	627	85.5
East South Central:											
Kentucky	410	336	74	22.0	15.0	26	9.2	2,488	(B)	161	25.0
Tennessee	518	382	136	35.5	23.6	71	27.0	3,190	(B)	195	39.3
Alabama	440	324	116	35.7	24.2	106	24.8	3,186	(B)	162	39.0
Mississippi	289	221	68	30.9	16.4	94	20.1	2,127	(B)	109	37.4
West South Central:											
Arkansas	312	237	76	32.0	22.0	46	8.1	1,488	(B)	120	33.3
Louisiana	404	305	99	32.4	26.0	107	21.4	6,962	89.5	149	42.0
Oklahoma	376	299	77	25.9	19.9	20	12.9	2,342	87.2	151	30.7
Texas	1,371	988	384	38.8	32.6	143	28.5	150,347	58.4	524	45.7
Mountain:											
Montana	85	68	16	23.5	5.4	(Z)	(B)	(Z)	(B)	33	11.4
Idaho	94	67	26	39.0	16.2	(Z)	(B)	1,044	93.3	35	30.2
Wyoming	37	30	7	23.7	15.7	(Z)	(B)	911	24.8	14	21.6
Colorado	247	187	60	32.2	18.4	5	52.1	16,162	20.4	99	30.6
New Mexico	116	70	45	64.8	37.7	1	60.3	30,005	36.5	41	63.0
Arizona	307	161	146	90.8	78.8	5	44.6	19,803	40.3	105	98.5
Utah	109	77	32	41.8	28.4	(Z)	(B)	1,992	77.2	41	43.5
Nevada	66	31	35	113.7	71.0	2	117.7	1,998	82.5	20	104.1
Pacific:											
Washington	431	320	111	34.7	14.8	5	78.1	3,461	91.7	168	30.4
Oregon	303	226	78	34.3	22.7	2	78.4	1,880	81.1	119	32.3
California	2,415	1,792	623	34.8	30.2	116	69.9	179,547	37.1	944	37.6
Alaska	12	7	5	69.6	36.0	(Z)	(B)	(Z)	(B)	3	54.1
Hawaii	76	44	32	73.3	51.7	(Z)	(B)	2,972	300.0	27	85.7

B base of percent less than 500. Z Less than 500 or 0.05 percent.

Source: U.S. Bureau of the Census, 1980 Census of Population, Supplementary Reports, PC80-S1-1, May 1981; 1970 Census of Population; and unpublished data.

Table 4-2. Percent 65 Years and Over for All Classes in 1980, 1970, and 1960, for Blacks and Hispanics in 1980 and 1970, and Percent 75 Years and Over, 1980 and 1970, for Regions, Divisions, and States

Region, division, and State	65 years and over							All classes, 75 years and over	
	All classes			Black		Hispanic			
	1980	1970	1960	1980	1970	1980[1]	1970[2]	1980	1970
United States	11.3	9.8	9.2	7.8	6.8	4.9	4.1	4.4	3.7
Regions:									
Northeastern States	12.4	10.6	10.1	7.0	5.7	4.5	2.5	4.9	3.9
North Central States	11.4	10.1	9.8	7.1	6.1	3.6	2.7	4.6	4.0
The South	11.3	9.6	8.3	8.7	7.8	6.4	4.9	4.2	3.4
The West	10.0	8.8	8.6	6.0	4.8	4.2	4.3	3.8	3.4
Northeast:									
New England	12.3	10.7	10.7	5.4	4.7	3.7	3.1	5.1	4.2
Middle Atlantic	12.4	10.5	9.9	7.2	5.7	4.6	2.4	4.8	3.9
North Central:									
East North Central	10.8	9.4	9.3	6.9	5.8	3.3	2.5	4.3	3.6
West North Central	12.8	11.7	11.2	8.1	7.9	5.0	3.4	5.5	4.8
South:									
South Atlantic	11.8	9.5	8.1	8.0	6.8	9.6	6.1	4.3	3.4
East South Central	11.3	9.9	8.7	10.4	9.5	9.2	3.5	4.3	3.6
West South Central	10.4	9.5	8.4	9.0	8.6	5.1	4.6	4.0	3.5
West:									
Mountain	9.3	8.4	7.7	5.2	5.0	5.0	4.7	3.4	3.1
Pacific	10.2	9.0	8.8	6.2	4.8	3.9	4.2	3.0	3.5
New England:									
Maine	12.5	11.5	11.0	4.7	4.3	6.0	4.6	5.2	4.6
New Hampshire	11.2	10.6	11.2	3.6	2.8	5.4	2.6	4.5	4.1
Vermont	11.4	10.6	11.2	4.6	6.0	8.2	5.5	4.8	4.3
Massachusetts	12.7	11.1	11.1	5.6	5.3	3.7	3.3	5.3	4.4
Rhode Island	13.4	10.9	10.4	5.6	5.7	5.3	3.4	5.4	4.2
Connecticut	11.7	9.5	9.6	5.1	4.0	3.2	2.8	4.7	3.7
Middle Atlantic:									
New York	12.3	10.7	10.1	6.7	5.1	4.6	2.6	4.9	3.9
New Jersey	11.7	9.7	9.2	6.2	5.2	4.2	1.4	4.5	3.5
Pennsylvania	12.9	10.7	10.0	9.1	7.4	4.9	1.6	4.9	4.0
East North Central									
Ohio	10.8	9.3	9.2	7.8	6.7	4.9	2.9	4.3	3.6
Indiana	10.7	9.5	9.6	7.2	6.3	4.2	2.4	4.3	3.7
Illinois	11.0	9.8	9.7	6.5	5.5	2.7	2.4	4.4	3.7
Michigan	9.9	8.4	8.2	6.9	5.6	4.0	3.0	3.8	3.2
Wisconsin	12.0	10.7	10.2	3.8	3.2	3.6	2.1	5.0	4.2
West North Central:									
Minnesota	11.8	10.7	10.4	4.8	5.8	4.7	2.4	5.1	4.4
Iowa	13.3	12.4	11.9	6.4	7.1	5.8	3.9	5.9	5.3
Missouri	13.2	11.9	11.7	8.9	8.2	6.8	4.0	5.4	4.7
North Dakota	12.3	10.7	9.3	0.9	0.8	2.5	1.5	5.1	4.4
South Dakota	13.2	12.0	10.5	2.6	3.1	3.3	1.8	5.9	5.0
Nebraska	13.1	12.3	11.6	6.0	6.0	3.9	2.8	5.8	5.2
Kansas	13.0	11.8	11.0	8.0	8.7	4.1	3.6	5.6	4.9
South Atlantic:									
Delaware	10.0	8.0	8.0	7.0	6.1	4.1	3.8	3.8	3.0
Maryland	9.4	7.6	7.3	6.0	5.6	4.8	2.9	3.5	2.7
District of Columbia	11.6	9.3	9.1	9.5	5.5	5.5	4.9	4.4	3.4
Virginia	9.4	7.8	7.3	8.6	7.4	4.6	2.5	3.5	2.8
West Virginia	12.2	11.[illegible]	9.3	15.1	14.5	11.0	5.9	4.6	4.2
North Carolina	10.3	8.1	6.9	8.6	7.0	6.5	1.9	3.7	2.8
South Carolina	9.2	7.3	6.3	8.1	6.7	6.0	2.2	3.1	2.5
Georgia	9.5	8.0	7.4	8.1	7.4	6.1	3.0	3.4	2.8
Florida	17.3	14.5	11.2	7.5	6.4	11.1	7.5	6.4	5.0
East South Central:									
Kentucky	11.2	10.4	9.6	10.0	10.3	9.1	3.0	4.4	4.0
Tennessee	11.3	9.7	8.7	9.8	9.0	9.4	3.2	4.2	3.6
Alabama	11.3	9.4	8.0	10.6	9.4	9.6	3.4	4.2	3.4
Mississippi	11.5	10.0	8.7	10.6	9.6	8.6	4.7	4.3	3.6
West South Central:									
Arkansas	13.7	12.3	10.9	12.4	12.1	8.3	4.3	5.2	4.7
Louisiana	9.6	8.4	7.4	8.7	8.1	7.0	5.3	3.5	2.9
Oklahoma	12.4	11.7	10.7	9.7	10.3	4.1	3.5	5.0	4.5
Texas	9.6	8.8	7.8	8.3	8.0	5.0	4.6	3.7	3.2
Mountain:									
Montana	10.7	9.9	9.7	4.5	4.6	4.0	3.2	4.2	4.3
Idaho	9.9	9.5	8.7	4.2	4.0	2.9	2.9	3.7	3.8
Wyoming	7.9	9.0	7.8	4.8	5.6	3.7	3.9	3.0	3.5
Colorado	8.6	8.5	9.0	4.7	4.7	4.8	4.7	3.4	3.4
New Mexico	8.9	6.9	5.4	6.1	4.7	6.3	5.4	3.2	2.5
Arizona	11.3	9.1	6.9	6.7	6.6	4.5	4.2	3.9	3.0
Utah	7.5	7.3	6.7	4.6	4.9	3.3	2.6	2.8	2.7
Nevada	8.2	6.3	6.4	3.6	3.1	3.7	4.0	2.5	2.0
Pacific:									
Washington	10.4	9.4	9.8	4.7	3.9	2.9	2.6	4.1	3.8
Oregon	11.5	10.8	10.4	6.4	5.1	2.9	3.0	4.5	4.3
California	10.2	9.0	8.8	6.3	4.9	4.0	4.2	4.0	3.5
Alaska	2.9	2.3	2.4	1.6	1.1	0.9	0.6	0.8	0.7
Hawaii	7.9	5.7	4.6	0.9	0.9	4.2	3.2	2.8	1.9

[1] Persons of Hispanic or Spanish origin. [2] For New York, New Jersey, and Pennsylvania, persons of Puerto Rican birth and parentage only; for five Southwestern States, persons of Spanish language or Spanish surname; for remaining States, persons of Spanish language. Note that Hispanic persons may be of any race.

Source: U.S. Bureau of the Census, Census of Population, 1980, 1970, and 1960, and unpublished data

Table 4-3. Estimates of the Components of Change in the Population 65 Years and Over, for Regions, Divisions, and States: 1970-80

(Numbers in thousands. Figures relate to April 1 or to the period April 1 to April 1)

Region, division, and State	Population 65 and over		Increase, 1970 to 1980[1]		Components of change, 1970 to 1980			
							Net migration[3]	
	1980	1970[2]	Amount	Percent	Number reaching age 65	Deaths	Amount[4]	Percent[5]
United States	25,544	20,325	5,219	25.7	17,547	12,405	+77	+0.3
Regions:								
Northeastern States	6,072	5,245	827	15.8	4,339	3,188	-323	-5.7
North Central States	6,691	5,790	901	15.6	4,620	3,537	-181	-2.9
The South	8,484	6,149	2,335	38.0	5,700	3,804	+439	+6.0
The West	4,298	3,141	1,157	36.8	2,889	1,877	+144	+3.9
Northeast:								
New England	1,520	1,289	231	17.9	1,028	775	-21	-1.6
Middle Atlantic	4,551	3,955	596	15.1	3,311	2,413	-302	-7.1
North Central:								
East North Central	4,493	3,845	648	16.8	3,197	2,395	-153	-3.7
West North Central	2,199	1,945	254	13.0	1,422	1,142	-26	-1.3
South:								
South Atlantic	4,363	2,996	1,367	45.6	2,872	1,851	+347	+9.4
East South Central	1,657	1,297	360	27.7	1,150	813	+23	+1.6
West South Central	2,463	1,856	607	32.7	1,678	1,139	+68	+3.2
West								
Mountain	1,060	714	346	48.6	702	432	+76	+8.5
Pacific	3,237	2,428	809	33.4	2,186	1,446	+69	+2.4
New England								
Maine	141	121	20	16.1	93	74	(Z)	(Z)
New Hampshire	103	82	21	25.5	67	51	+5	+5.3
Vermont	58	50	8	16.1	38	31	+1	+1.1
Massachusetts	727	641	86	13.3	490	382	-22	-3.3
Rhode Island	127	106	21	20.0	87	63	-1	-1.8
Connecticut	365	289	76	26.3	253	175	-2	-0.9
Middle Atlantic								
New York	2,161	1,975	186	9.4	1,588	1,158	-244	-11.8
New Jersey	860	697	163	23.3	620	436	-20	-2.7
Pennsylvania	1,531	1,283	248	19.3	1,103	819	-35	-2.6
East North Central								
Ohio	1,169	1,001	168	16.8	836	640	-26	-2.5
Indiana	585	495	90	18.2	408	315	-1	-0.4
Illinois	1,261	1,105	156	14.1	917	681	-80	-6.8
Michigan	912	766	146	19.1	664	474	-43	-5.2
Wisconsin	564	477	87	18.2	373	286	(Z)	(Z)
West North Central								
Minnesota	480	416	64	15.4	[illegible]	237	-4	-1.1
Iowa	387	356	31	8.9	[illegible]	208	-6	-1.8
Missouri	648	566	82	14.5	434	347	-3	-0.7
North Dakota	80	68	12	17.7	54	39	-2	-3.8
South Dakota	91	82	9	10.4	57	46	-1	-2.9
Nebraska	206	186	20	10.5	129	107	-1	-1.1
Kansas	306	270	36	13.2	196	157	-3	-1.4
South Atlantic								
Delaware	59	45	14	30.8	42	30	+2	+3.9
Maryland	396	301	95	31.6	289	194	(Z)	+0.1
District of Columbia	74	76	-2	-2.4	60	41	-20	-28.4
Virginia	505	375	130	34.7	361	237	+6	+1.4
West Virginia	238	200	38	19.0	171	128	-4	-2.4
North Carolina	602	420	182	43.4	426	265	+22	+4.3
South Carolina	287	197	90	46.2	208	125	+8	+3.2
Georgia	517	373	144	38.5	371	237	+10	+2.3
Florida	1,685	1,009	676	66.9	964	593	+325	+34.1
East South Central								
Kentucky	410	344	66	19.1	281	218	+3	+0.7
Tennessee	518	391	127	32.5	359	244	+12	+2.6
Alabama	440	333	107	32.1	310	208	+5	+1.3
Mississippi	289	229	60	26.1	201	144	+3	+1.3
West South Central								
Arkansas	312	241	71	29.6	204	145	+13	+6.8
Louisiana	404	311	93	30.1	289	200	+4	+1.2
Oklahoma	376	302	74	24.6	247	183	+11	+3.2
Texas	1,371	1,003	368	36.8	938	610	+40	+3.4
Mountain								
Montana	85	71	14	19.4	59	43	-1	-2.8
Idaho	94	70	24	34.8	64	41	+1	+1.7
Wyoming	37	31	6	18.6	27	19	-1	-6.8
Colorado	247	192	55	29.0	164	114	+5	+2.2
New Mexico	116	74	42	56.5	90	44	+6	+6.0
Arizona	307	166	141	85.1	188	102	+55	+23.3
Utah	109	79	30	38.1	74	46	+3	+2.9
Nevada	66	32	34	108.1	46	23	+11	+22.1
Pacific								
Washington	431	327	104	32.1	292	198	+11	+2.9
Oregon	303	228	75	33.3	199	137	+14	+5.1
California	2,415	1,817	598	32.9	1,629	1,082	+50	+2.4
Alaska	12	8	4	52.8	11	4	-2	-33.6
Hawaii	76	49	27	56.2	55	24	-2	-5.0

Z Less than 500. [1] A minus (-) sign denotes a net decrease. [2] 1970 census counts adjusted for net underenumeration. [3] A plus (+) sign denotes net immigration and a minus (-) sign denotes net outmigration. [4] Computed by the residual method from the population data and the other components shown. [5] Net migration for 1970-80 as a percent of the population 65 years and over in 1970.

Source: U.S. Bureau of the Census, 1980 Census of Population, 1970 Census of Population; U.S. National Center for Health Statistics, Mortality, 1971, 1972, 1973, 1977, Vol. 2, Part B; 1978 unpublished mortality data, and 1979-1980 mortality estimated by the U.S. Bureau of the Census.

Table 4-4. Estimated Net Migration of the Population Cohort 65 Years and Over at Mid-Decade, for Regions, Divisions, and States: 1970-80 and 1960-70

(Numbers in thousands. Rate for 1970-80 represents net migration between 1970 and 1980 of the cohort 60 and over in 1970, 65 and over in 1975, and 70 and over in 1980 as percent of the population 65 and over in 1975 (average of the population 60 and over in 1970 and 70 and over in 1980). Net migration was computed by the residual method using national census survival rates. No adjustment has been made to independent estimates of net immigration for the United States. The same procedure was used for 1960-70. A plus sign(+) denotes inmigration and a minus sign(-) denotes outmigration)

Region, division, and State	1970-80		1960-70	
	Amount	Rate	Amount	Rate
United States	-113	-0.5	+26	+0.1
Regions:				
Northeastern States	-389	-6.8	-228	-4.6
North Central States	-238	-3.8	-128	-2.3
The South	+363	+5.1	+269	+4.8
The West	+151	+4.2	+133	+4.9
Northeast:				
New England	-22	-1.6	-19	-1.6
Middle Atlantic	-367	-8.5	-209	-5.6
North Central:				
East North Central	-234	-5.6	-138	-3.8
West North Central	-4	-0.2	+10	+0.5
South:				
South Atlantic	+308	+8.8	+195	+8.0
East South Central	+4	+0.3	+3	+0.3
West South Central	+51	+2.4	+50	+3.2
West:				
Mountain	+78	+9.3	+36	+6.0
Pacific	+73	+2.6	+98	+4.6
New England:				
Maine	+3	+2.3	-3	-2.7
New Hampshire	+4	+4.9	+1	+0.9
Vermont	+1	+2.0	(Z)	-1.0
Massachusetts	-24	-3.5	-14	-2.3
Rhode Island	-2	-1.7	-2	-1.7
Connecticut	-5	-1.5	(Z)	(Z)
Middle Atlantic:				
New York	-238	-11.2	-137	-7.3
New Jersey	-44	-5.6	-9	-1.4
Pennsylvania	-85	-6.1	-63	-5.1
East North Central:				
Ohio	-65	-5.9	-35	-3.7
Indiana	-21	-3.9	-13	-2.7
Illinois	-95	-7.9	-62	-5.9
Michigan	-50	-5.9	-29	-4.2
Wisconsin	-4	-0.8	+3	+0.6
West North Central:				
Minnesota	+7	+1.5	+5	+1.4
Iowa	-1	-0.3	(Z)	(Z)
West North Central--Con.				
Missouri	-13	-2.2	-4	-0.7
North Dakota	(Z)	-0.1	(Z)	-0.4
South Dakota	(Z)	+0.5	(Z)	+0.5
Nebraska	+2	+1.1	+4	+2.2
Kansas	+2	+0.6	+4	+1.7
South Atlantic:				
Delaware	(Z)	+0.7	(Z)	+1.0
Maryland	-12	-3.4	+4	+1.4
District of Columbia	-13	-16.9	-12	-16.6
Virginia	+2	+0.5	+2	+0.6
West Virginia	-10	-4.5	-8	-4.4
North Carolina	+12	+2.5	+6	+1.6
South Carolina	+5	+2.3	-3	-2.0
Georgia	+5	+1.1	+2	+0.6
Florida	+317	+25.9	+205	+29.3
East South Central:				
Kentucky	-8	-2.0	-1	-0.4
Tennessee	+7	+1.7	+5	+1.4
Alabama	+2	+0.6	+3	+1.2
Mississippi	+2	+0.8	-4	-1.8
West South Central:				
Arkansas	+11	+4.0	+9	+4.2
Louisiana	-6	-1.8	-3	-1.0
Oklahoma	+5	+1.4	+8	+2.8
Texas	+42	+3.6	+37	+4.3
Mountain:				
Montana	-1	-1.6	-1	-1.5
Idaho	+3	+4.0	+1	+1.7
Wyoming	-2	-4.9	-1	-3.5
Colorado	+8	+3.6	+6	+3.7
New Mexico	+8	+9.6	+2	+2.5
Arizona	+50	+23.6	+24	+21.2
Utah	+4	+4.6	+2	+3.3
Nevada	+7	+16.7	+2	+9.0
Pacific:				
Washington	+11	+2.9	+3	+1.2
Oregon	+11	+4.1	+10	+4.8
California	+57	+2.7	+92	+5.9
Alaska	-2	-22.3	-2	-30.6
Hawaii	-3	-5.2	-6	-17.3

Z Less than 500 or 0.05 percent.

Table 4-5. Distribution of the Population 65 Years and Over and 4 Years and Over in 1979, by Mobility Status for 1975-79, by Sex

(Data relate to the net movement of cohorts aged 61 and over in 1975 and 65 and over in 1979, and of cohorts of all ages in 1975 and 4 years old and over in 1979, i.e. to the period March 1975 to March 1979)

Mobility status	Both sexes			Male			Female		
	65 years and over in 1979	4 years and over in 1979	Ratio of 65 years and over to 4 years and over	65 years and over in 1979	4 years and over in 1979	Ratio of 65 years and over to 4 years and over	65 years and over in 1979	4 years and over in 1979	Ratio of 65 years and over to 4 years and over
Total	100.0	100.0	1.00	100.0	100.0	1.00	100.0	100.0	1.00
Same house (nonmovers)	82.7	58.3	1.42	83.7	57.7	1.45	82.0	58.9	1.39
Different house	17.0	40.2	0.42	15.9	40.7	0.39	17.7	39.8	0.44
Same county	9.6	23.2	0.41	8.1	23.2	0.35	10.6	23.2	0.46
Different county	7.4	17.0	0.43	7.8	17.5	0.45	7.1	16.6	0.42
Within State	3.8	9.0	0.42	4.1	9.0	0.45	3.6	8.9	0.40
Between States	3.6	8.1	0.44	3.8	8.5	0.45	3.4	7.7	0.44
Contiguous	1.1	2.5	0.43	1.1	2.6	0.43	1.0	2.4	0.43
Noncontiguous	2.5	5.6	0.45	2.6	5.8	0.45	2.4	5.3	0.45
Abroad	0.4	1.5	0.25	0.4	1.7	0.26	0.3	1.3	0.25

Source: U.S. Bureau of the Census, Current Population Reports, Series P-20, No. 353, August 1980.

Table 4-6. Mobility Rates and Migration Rates, by Age: 1975-79, 1975-76, 1965-66, and 1955-56

(Percent of population in age groups with different residence)

Initial age	Terminal age (years)	1975-79 rates		Initial age (years)	Terminal age (years)	1975-76 rates		1965-66 rates		1955-56 rates	
		Different house, same county	Different county			Different house, same county	Different county	Different house, same county	Different county	Different house, same county	Different county
All ages..............	Total, 4 and over	23.2	17.0	All ages	Total, 1 and over	10.8	6.4	12.7	6.6	13.7	6.8
				Under 4	1 to 4	17.6	9.2	18.5	10.3	19.2	9.3
1 to 9 years..............	5 to 13	27.1	18.6	4 to 12	5 to 13	10.2	6.0	12.3	6.1	13.4	5.8
10 to 13 years..............	14 to 17	18.1	10.7	13 to 16	14 to 17	6.9	3.9	10.1	4.0	12.2	5.8
14 and 15 years..............	18 and 19	22.6	15.8	17 and 18	18 and 19	15.7	8.0	16.7	8.9	18.7	10.6
16 to 20 years..............	20 to 24	35.4	28.1	19 to 23	20 to 24	23.2	14.8	25.2	17.2	26.5	18.0
21 to 30 years..............	25 to 34	36.4	28.7	24 to 33	25 to 34	17.3	9.8	19.2	10.5	18.8	9.6
31 to 40 years..............	35 to 44	22.4	16.0	34 to 43	35 to 44	8.1	5.3	10.9	5.1	11.5	5.5
41 to 60 years..............	45 to 64	13.3	9.6	44 to 63	45 to 64	4.7	3.0	7.2	3.2	8.6	3.5
61 to 70 years..............	65 to 74	9.9	7.8	64 to 73	65 to 74	3.8	2.0	6.2	2.7	7.2	2.8
71 years and over..........	75 and over	9.1	6.5	74 and over	75 and over	3.1	2.1	6.6	2.2		

Source: U.S. Bureau of the Census, Current Population Reports, Series P-20, Nos. 73, 156, 305, 331, and 353.

Table 4-7. Distribution of the White, Black, and Hispanic Populations 65 Years and Over by Urban and Rural Residence and Size of Place, and Percent 65 Years and Over of Total Population: 1970

(Numbers in thousands)

Race	Total	Urban							Rural		
		Total	Urbanized areas			Other places of--			Total	Places of 1,000 to 2,500	Other rural
			Total	Central cities	Urban fringe	10,000 or more	2,500 to 10,000				
NUMBER											
Total..................................	20,066	14,631	11,106	6,842	4,264	1,788	1,737		5,434	903	4,532
White[1]..................................	18,330	13,309	10,049	5,950	4,100	1,641	1,619		5,021	852	4,169
Black..................................	1,559	1,192	969	812	137	136	107		367	44	323
Hispanic[2]..................................	382	330	271	194	77	29	30		52	(NA)	(NA)
PERCENT OF ALL AGES											
Total..................................	9.9	9.8	9.4	10.7	7.8	10.8	12.2		10.1	13.6	9.6
White[1]..................................	10.3	10.3	10.0	12.0	8.0	11.1	12.5		10.3	13.9	9.7
Black..................................	6.9	6.5	6.0	6.2	5.4	8.7	9.7		8.7	10.4	8.5
Hispanic[2]..................................	4.1	4.0	3.9	4.2	3.4	4.3	5.0		4.6	(NA)	(NA)
PERCENT OF ALL AREAS											
Total..................................	100.0	72.9	55.3	34.1	21.2	8.9	8.7		27.1	4.5	22.6
White[1]..................................	100.0	72.6	54.8	32.5	22.4	9.0	8.8		27.4	4.6	22.7
Black..................................	100.0	76.5	60.9	52.1	8.8	8.7	6.9		23.5	2.8	20.7
Hispanic[2]..................................	100.0	86.3	70.9	50.8	20.2	7.7	7.7		13.7	(NA)	(NA)

NA Not available.

[1] Excludes a small number of Hispanic persons who were tabulated as of "other" race.

[2] For New York, New Jersey, and Pennsylvania, persons of Puerto Rican birth and percentage only; for five Southwestern States, persons of Spanish language or Spanish surname; for remaining States, persons of Spanish language. Note that Hispanics may be of any race.

Source: U.S. Bureau of the Census, Census of Population: 1970, General Population Characteristics, Final Report, PC(1)-B1, United States Summary, table 52, and PC(1)-C1, United States Summary, table 118.

Table 4-8. Distribution of the White, Black, and Hispanic Populations 65 Years and Over by Metropolitan Residence and Size of Metropolitan Area, and Percent 65 Years and Over of Total Population: 1980, 1975, and 1970

(Numbers in thousands. Data exclude inmates of institutions. Data pertain to the 1970 definition of metropolitan areas)

Race and Spanish origin	Total	All metropolitan areas			Metropolitan areas of 1 million or more		Metropolitan areas of less than 1 million		Nonmetropolitan areas[1]			
		Total	Central cities	Outside central cities	In central cities	Outside central cities	In central cities	Outside central cities	Total	In counties with a place of 25,000 or more	In counties with a place of 2,500 to 24,999	In counties with a place of less than 2,500
1980												
Number												
Total	23,763	15,085	7,162	7,922	3,760	4,680	3,402	3,242	8,658	1,956	5,553	1,150
White	21,466	13,495	5,970	7,525	3,027	4,479	2,963	3,046	7,951	1,801	5,124	1,026
Black	2,019	1,377	1,055	321	643	170	413	151	643	133	394	115
Hispanic[2]	563	460	291	170	168	115	123	55	102	20	71	11
Percent of All Ages												
Total	10.9	10.2	11.8	9.1	12.0	8.9	11.6	9.3	12.3	11.3	12.5	13.5
White	11.6	10.8	13.4	9.4	14.2	9.4	12.6	9.5	12.5	11.5	12.8	13.4
Black	7.9	7.0	7.4	5.9	7.1	4.9	7.8	7.9	11.1	9.4	10.8	15.7
Hispanic[2]	6.2	4.2	4.6	3.7	4.3	3.6	4.9	3.8	4.6	3.1	4.9	8.3
Percent of All Areas												
Total	100.0	63.5	30.2	33.4	15.8	19.7	14.3	13.7	36.5	8.2	23.4	4.8
White	100.0	62.9	27.8	35.1	14.1	20.9	13.7	14.2	37.1	8.4	23.9	4.8
Black	100.0	68.2	52.3	15.9	31.8	8.4	20.5	7.5	31.8	6.6	19.5	5.7
Hispanic[2]	100.0	81.7	51.7	30.2	29.8	20.4	21.8	9.8	18.1	3.6	12.6	2.0
1975												
Number												
Total	21,127	13,445	6,737	6,707	3,782	4,053	2,955	2,654	7,682	1,926	4,730	1,026
White	19,206	12,091	5,701	6,390	3,117	3,877	2,585	2,513	7,115	1,770	4,387	958
Black	1,721	1,176	919	257	601	145	318	112	544	152	324	68
Hispanic[2]	405	323	198	125	125	84	73	41	83	23	45	15
Percent of All Ages												
Total	10.1	9.4	11.0	8.2	11.6	8.4	10.3	8.1	11.4	10.3	11.7	13.1
White	10.5	9.9	12.4	8.4	13.7	8.6	11.2	8.2	11.7	10.3	12.0	13.8
Black	7.2	6.6	6.7	6.3	6.7	5.8	6.6	7.0	9.2	9.8	9.4	7.5
Hispanic[2]	3.6	3.5	3.7	3.3	3.5	3.2	4.0	3.5	4.0	3.3	3.6	12.8
Percent of All Areas												
Total	100.0	63.6	31.9	31.7	17.9	19.2	14.0	12.6	36.4	9.1	22.4	4.9
White	100.0	63.0	29.7	33.3	16.2	20.2	13.5	13.1	37.0	9.2	22.8	5.0
Black	100.0	68.3	53.4	14.9	34.9	8.4	18.5	6.5	31.6	8.8	18.8	4.0
Hispanic[2]	100.0	79.8	48.9	30.9	30.9	20.7	18.0	10.1	20.5	5.7	11.1	3.7
1970												
Number												
Total	19,235	12,344	6,640	5,704	3,816	3,484	2,825	2,220	6,891	1,511	4,479	902
White	17,532	11,207	5,751	5,457	3,251	3,348	2,500	2,108	6,324	1,411	4,095	818
Black	1,549	1,027	815	212	519	117	296	95	522	90	357	75
Hispanic[2]	405	317	216	101	134	64	82	37	89	16	63	11
Percent of All Ages												
Total	9.6	9.0	10.6	7.7	11.1	7.7	9.9	7.7	11.0	9.5	11.3	12.5
White	10.0	9.4	11.8	7.8	13.0	7.8	10.5	7.7	11.2	9.7	11.5	13.1
Black	7.0	6.3	6.3	6.2	6.0	5.7	7.0	6.9	9.1	8.1	9.4	9.6
Hispanic[2]	4.5	4.3	4.6	3.7	4.5	3.6	4.8	3.8	5.6	4.0	6.0	8.5
Percent of All Areas												
Total	100.0	64.2	34.5	29.7	19.8	18.1	14.7	11.5	35.8	7.9	23.3	4.7
White	100.0	63.9	32.8	31.1	18.5	19.1	14.3	12.0	36.1	8.0	23.4	4.7
Black	100.0	66.3	52.6	13.7	33.5	7.6	19.1	6.1	33.7	5.8	23.0	4.8
Hispanic[2]	100.0	78.3	53.3	24.9	33.1	15.8	20.2	9.1	22.0	4.0	15.6	2.7

[1] Includes areas which gained metropolitan status between 1970 and 1977.

[2] Hispanics may be of any race.

Source: U.S. Bureau of the Census, Current Population Reports, Special Studies P-23, No. 75, for 1970 data; data for 1970 are based on 1-in-100 sample of the 1970 Census of Population. Data for 1980 and 1975 are unpublished data based on the Current Population Survey; they have been adjusted to current independent estimates for age, sex, and race based on the 1970 census.

Chapter 5.
Mortality and Survival

QUANTITY VS. QUALITY OF LIFE

Progress in the "control" or management of the aging process from a demographic point of view is measured principally in terms of the increase in the "quantity" of life, as shown, for example, by reductions in mortality rates and increases in the proportion surviving to various ages or in average years of remaining life. However, progress may also be measured in terms of improvements in the "quality" of life, as shown, for example, by reductions in the incidence of accidents and injuries, in the incidence and prevalence of morbidity, mental illness, and physical disability, in the incidence of hospitalization and institutionalization and in the proportions hospitalized, institutionalized, or having functional limitations, and in the proportions widowed or living alone. The discussion in this chapter is largely concerned with the quantity dimension; the quality dimension, with particular reference to health, is considered briefly in the next chapter.

The greater attention to mortality, survival, and longevity in this report should not be interpreted to imply that the quality of life is a less important area of concern for research and analysis, only that it is a less appropriate and less central area of demographic study. A principal thrust of health programs should be to make the later years of life vigorous, healthy, and satisfying, not merely to add additional years of life. Hayflick has suggested that, given a human life span of about 100 years, it could be society's goal to have all persons live healthy and active lives until their 100th birthday and then die peacefully in their sleep as they begin their 101st year.[29]

TRENDS IN LIFE EXPECTANCY AND AGE-SPECIFIC DEATH RATES

Progress in the reduction of mortality or in extending length of life is often measured by life expectancy at birth. Life expectancy represents the average number of years of life remaining at given ages, according to death rates prevailing at specific dates. Life expectancy at birth is a capsulized indicator ("standardized" for differences in age composition to a limited degree) of progress in the elimination of premature death. It has shown a tremendous increase since the beginning of this century, having risen from 49.2 years in 1900-02 (Original Death Registration States) to 69.6 years in 1954 and further to 73.6 years in 1980. (See table 5-1.) These figures imply a total gain of about 20 years in life expectancy in the first 53 or so years of this century, or an average annual gain of 0.4 year in this period. A plateau was reached about 1954, and little change occurred in the next 14 years (1954 to 1968). In the 12 years from 1968 to 1980, life expectancy at birth has advanced steadily, with the total gain amounting to 3.4 years and the average annual gain to 0.3 year.

Age differences. Since life expectation at birth is a function of all the death rates from infancy to the oldest ages, changes in this measure do not identify the segments of the age scale in which improvements have occurred. It is particularly useful for the present purpose to distinguish progress in life expectation or survival at the ages under 65 from progress at the ages over 65. We can summarize changes in death rates in a specified age range in terms of a life table survival rate linking the initial and terminal ages of the age range and in terms of an "age-bounded life expectancy" value. According to the U.S. life table for 1929-31, 54 percent of the newborn babies would reach age 65, while the U.S. life table for 1980 indicates that 77 percent would reach age 65 (table 5-2.). These figures imply a survival gain of 23 persons aged 65 per 100 babies in approximately a half century. The proportion of persons surviving from age 65 to age 80 was 35 percent in 1929-31 and 54 percent in 1980; these figures imply a survival gain of 20 persons aged 80 per 100 persons aged 65. Accordingly, the chance of survival from birth to age 65 and the chance of survival from age 65 to age 80 are both much higher than earlier, although the increase has been somewhat smaller for ages over 65. The difference in progress in survival is seen as more marked if the gains are calculated as a share of the maximum possible gain.[30] For the younger age group, 50 percent of the maximum possible gain in survival occurred between 1929-31 and 1980, but for the older age group, only 29 percent of the maximum possible gain occurred in this period.

A disproportionate share of the gains occurred between 1929-31 and 1954. The corresponding survival rates for 1954 (70 percent and 46 percent) were both closer to those for 1980 than to those for 1929-31. In fact, a higher percentage of the maximum possible gain occurred

---

[29] Leonard Hayflick, "The Strategy of Senescence," *The Gerontologist*, Vol. 14, No. 1, February 1974, pp. 37-45, esp. pp. 40 and 43.

[30] The gain in survival as a share of the maximum possible gain is computed as follows:

$$\frac{s_i^{t+a} - s_i^t}{1 - s_i^t}$$

where s_i^t represents the survival rate at some date and s_i^{t+a} represents the corresponding survival rate at a later date.

between 1930 and 1954 than between 1954 and 1980 for survival in both age bands.

Changes in life expectancy for ages below 65, represented here by the average years of life lived by a cohort between birth and age 65,[31] may be compared with changes in life expectation at age 65, to illustrate these differences further. Average years of life lived below age 65 increased from 52.9 years in 1929-31 to 59.4 years in 1954, 59.8 years in 1968, and 61.1 years in 1980. (See table 5-2.) Its peak possible value is 65 years. Average years of life remaining at age 65 has moved ahead more slowly in absolute terms from 12.3 years in 1929-31 to 14.4 years in 1954, 14.6 years in 1968, and 16.4 years in 1980 (table 5-1). Average years of life increased relatively little between 1954 and 1968, both for ages under 65 and for ages 65 and over. This measure reflects greater progress in years added below age 65 than above age 65 between 1929-31 and 1980 on an absolute basis but less progress on a relative basis. The absolute gains are 8.2 years and 4.1 years while the relative gains are 16 percent and 33 percent.

The progress in age-bounded life expectation recorded for the period 1929-31 to 1980 occurred mostly before 1954 for the age range under 65 and about equally before 1954 and after 1954 for the age range over 65 (figure 5-1). Accordingly, progress in age-bounded life expectancy over the last half century was more evenly distributed in time for the ages over 65 than for the ages under 65. If the comparison of the gains for the two age groups is considered in terms of the percent of the maximum possible gain, assuming age 80 as the peak age for the range 65 and over,[32] the younger age group showed a far greater share of its possible gain (54 percent) in the first period than in the second period (29 percent); whereas the older age group showed roughly equal shares (17 and 21 percent).

Age-specific death rates at the older ages for the period 1940 to 1980 reflect a sharp deceleration of the reduction in mortality among the older population during the late 1950's and the early 1960's, as compared with earlier and later years (table 5-3 and figure 5-2). For example, the death rates for ages 55 to 64, 65 to 74, 75 to 84, and 85 and over each dropped about 22 or 23 percent between 1940 and 1954 but remained nearly unchanged between 1954 and 1968. The annual data for the sixties and seventies show that a turning point in the trend of mortality at the older ages was reached about 1968, and that after that year, mortality at these ages resumed a strong downward trend.

The "actual" downward trend is steeper than is suggested by the decline in the "crude" death rate for ages 65 and over. The decline in the crude death rate for ages 65 and over is retarded by the aging of the older population; the age-adjusted decline is greater.[33] The average annual rate of decline in the age-adjusted death rate for ages 65 and over between 1968 and 1980 was 1.7 percent, as compared with 0.1 percent between 1954 and 1968 and 1.8 percent between 1940 and 1954. The reasons for the fluctuations in the trend of the death rates for the older population in the last several decades are not well understood. An initial understanding of these changes may be pursued in terms of an examination of age-specific death rates for sex, race, and cause-of-death categories.[34]

Life span, life expectancy, and rectangularization of the survival curve. The phenomenon of a limited life span is apparently general for animal life.[35] For the human species, life span appears to be set at about 100 years. At about this age, human life seems to expire even under optimum conditions and even in the absence of specific major pathology. As we have seen, life expectancy at birth, on the other hand, has been rising more or less steadily in the United States since records are available.

The corresponding life table curve of survivors has been becoming increasingly rectangular in shape (figure 5-3). The curve of survivors almost resembled the hypotenuse of a right triangle under conditions of high mortality, but as death rates have fallen, it has become increasingly

---

[31] The value for average years of life lived (age-bounded life expectation) between birth and age 65 is computed from the life table as:

$$\frac{T_0 - T_{65}}{l_0}$$

[32] The gain in age-bounded life expectation between ages x and x + z between time t and t + a as a share of the maximum possible gain in life expectation between ages x and x + z is computed as follows:

$$\frac{\dfrac{T_x^{t+a} - T_{x+z}^{t+a}}{l_x^{t+a}} - \dfrac{T_x^t - T_{x+z}^t}{l_x^t}}{z - \dfrac{T_x^t - T_{x+z}^t}{l_x^t}}$$

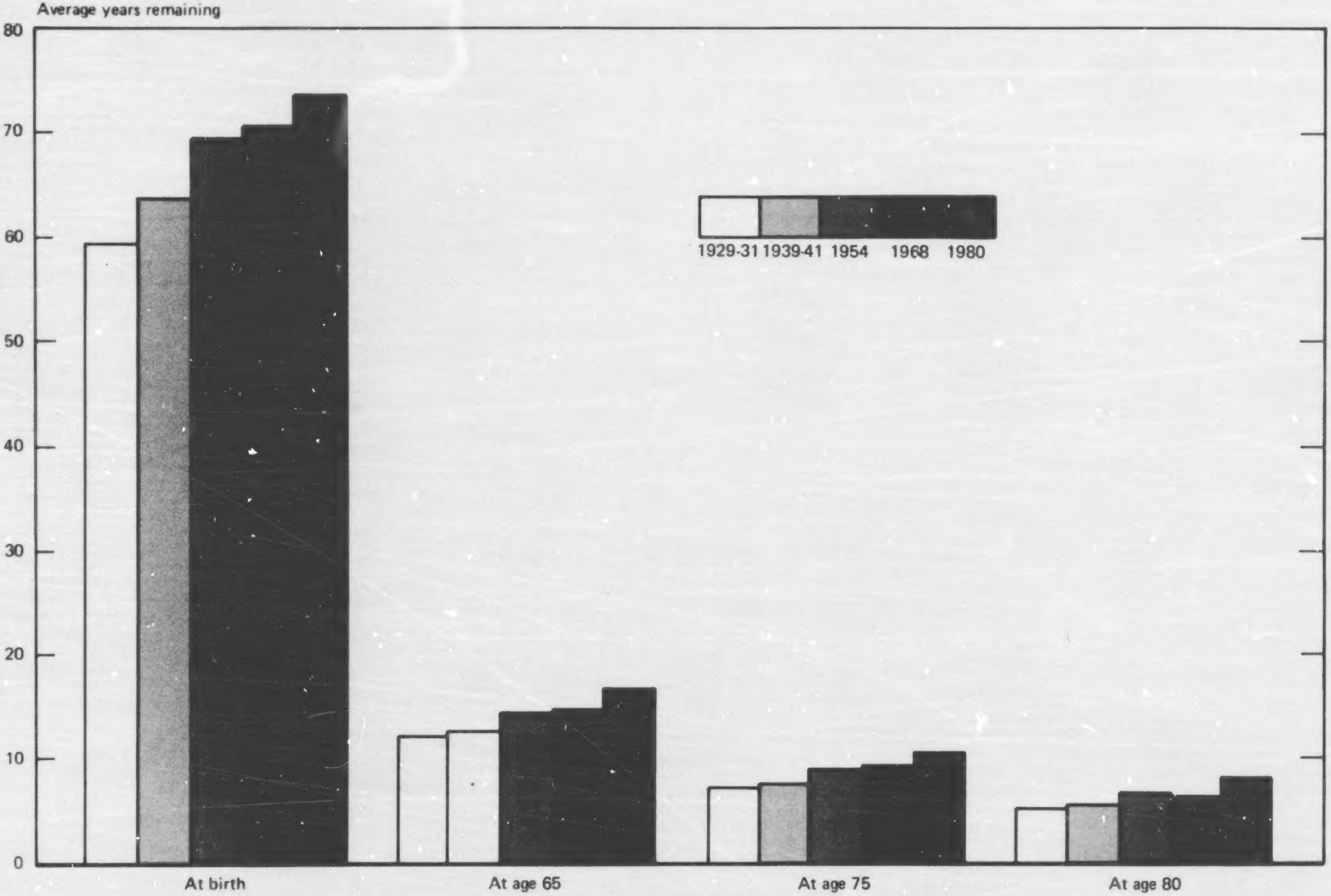
where $\frac{T_x - T_{x+z}}{l_x}$ presents the basic formula for age-bounded life expectation.

[33] See also Mary Grace Kovar and Lois A. Fingerhut, "Recent Trends in U.S. Mortality Among the Aged," in *Consequences of a Changing Population: Demographics of Aging*, pp. 150-177, Joint Hearing before the Select Committee on Population, U.S. House of Representatives, and the Select Committee on Aging, May 24, 1978, Washington, D.C., 1978.

[34] Analysis of the mortality of birth cohorts, separately for the sexes and races, and particularly in terms of cause-of-death categories, should provide additional insight into the trends of mortality and the prospects for survivorship of persons to various ages. Cohort analysis of mortality refers to analysis in terms of the death rates at successive ages in successive years for each group born in the same year or group of years. See U.S. Public Health Service, National Center for Health Statistics, "Cohort Mortality and Survivorship: U.S. Death-Registration States, 1900-1968," by Iwao M. Moriyama and Susan O. Gustavus, *Vital and Health Statistics*, Series 3, No. 16, 1972.

[35] See James F. Fries and Lawrence M. Crapo, *Vitality and Aging: Implications of the Rectangular Curve*, W.H. Freeman and Company, San Francisco, 1981, Chapter 11; James F. Fries, "Aging, Natural Death, and the Compression of Morbidity," *The New England Journal of Medicine*, Vol. 303, No. 3, July 17, 1980, pp. 130-135; Leonard Hayflick, "The Strategy of Senescence," *The Gerontologist*, Vol. 14, No. 1, Feb. 1974, pp. 37-45, esp. pp. 38-39; Zhores A. Medvedev, "Aging and Longevity: New Approaches and New Perspectives," *The Gerontologist*, Vol. 15, No. 3, June 1975, pp. 196-201, esp. pp. 199-200; and P.R.J. Burch, "What Limits Life Span?", pp. 31-56, in B. Benjamin, P.R. Cox, and J. Peel (eds.), *Population and the New Biology*, Academic Press, New York, 1974.

FIGURE 5-1. **Average Remaining Lifetime at Birth, Age 65, Age 75, and Age 80: 1929-31, 1939-41, 1954, 1968, 1980**

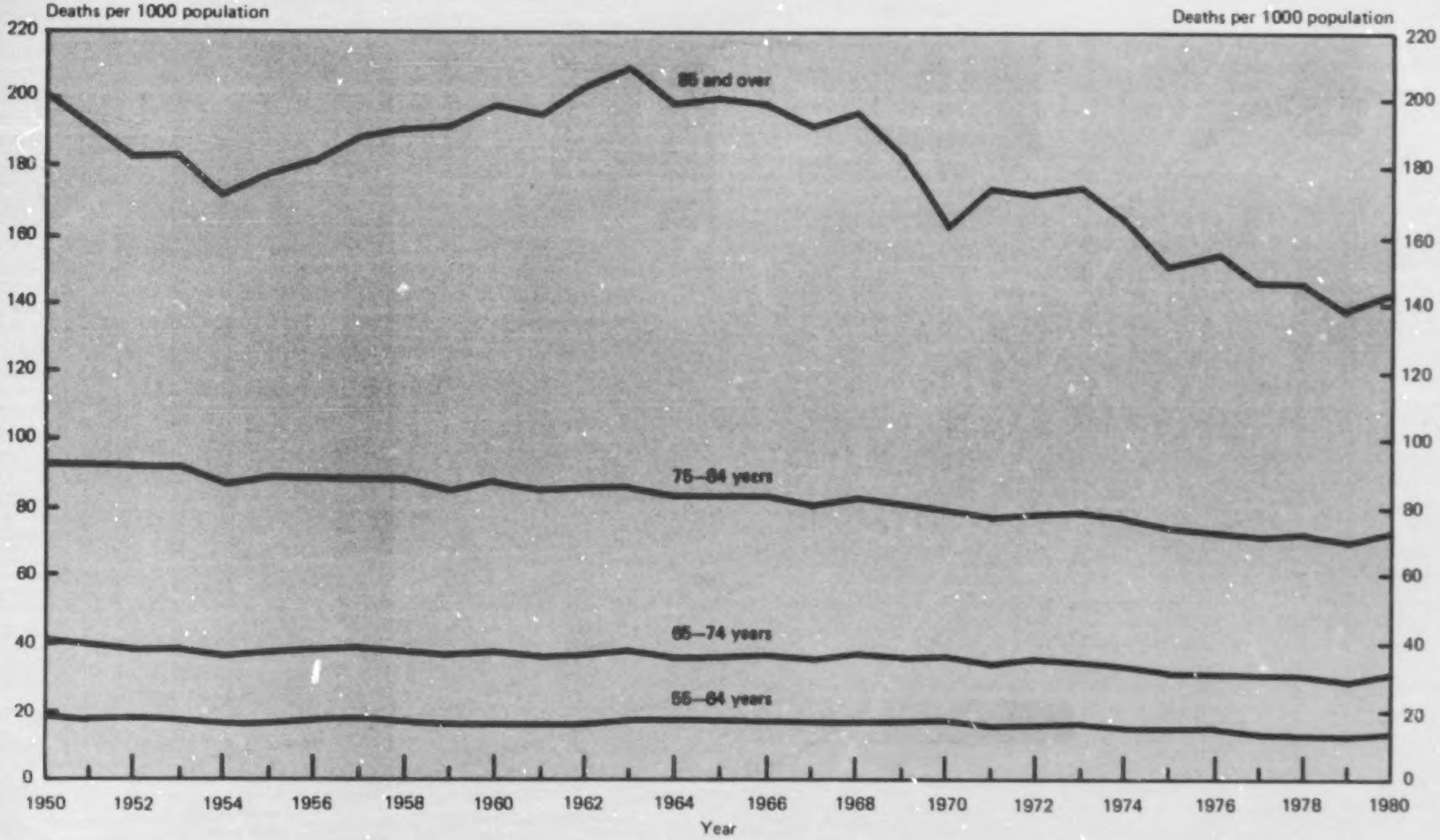


Source: Table 5-1.

55

56

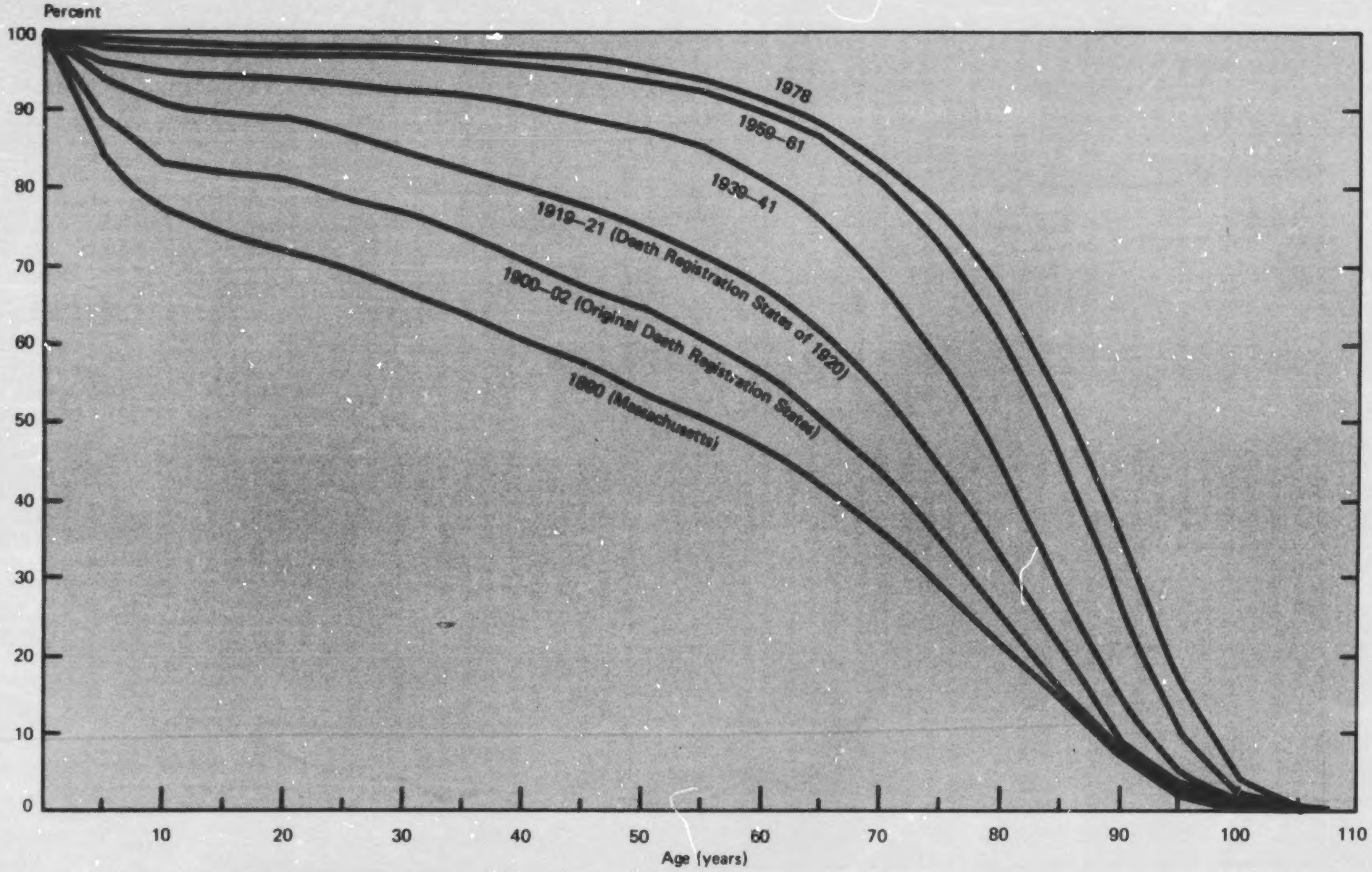
FIGURE 5-2. **Death Rates for the Population 55 Years Old and Over, by Age: 1950 to 1980**



Note: Points are plotted for each year.

Sources: U.S. Public Health Service, National Center for Health Statistics, *Vital Statistics of the United States, 1950 and 1970,* Vol. II - Mortality, Part A; "Annual Summary of Births, Deaths, Marriages, and Divorces: United States, 1980," *Monthly Vital Statistics Report*, Vol. 29, No. 13, September 17, 1981. Rates for 1979 and 1980 were estimated on the basis of a 10 percent sample of deaths.

FIGURE 5-3. **Percent Surviving to Each Exact Age of an Initial Cohort of White Female Births, According to Various Life Tables for the United States: 1890 to 1978**



Source: Based on life tables published by the U.S. Public Health Service, National Center for Health Statistics, or its predecessor agencies.

59

less steep and more level over most of the age span. A logical extension of the evolution of the present survival curve could be represented by a theoretical curve having a nearly rectangular shape, i.e., having a 90-degree angle and falling sharply just before the age represented by the life span. This type of curve would indicate the survival of nearly all newborn infants to extreme old age and the expiration of the entire cohort within a narrow band of ages just before the presumed life span. This theoretical construct implies the existence of a fixed life span for humans toward which life expectancy is gradually shifting. The approximate rectangularization of the survival curve may require decades to achieve, and by that date, procedures for extending human life span may have been developed.

Sex differences. Mortality of males is now well above that of females at every age of life. This fact is reflected in the much higher level of life expectation for females than for males. In 1978, life expectation at birth for females exceeded that for males by nearly 8 years. Expectation of life at birth in the United States in 1978 was 69.5 years for males and 77.2 years for females. A large part of this difference is accounted for by differences in the mortality of the sexes at ages over 65. Expectation of life at age 65 for men and women differed by 4.4 years in 1978 (14.0 years for males, 18.4 years for females), while the difference between the sexes in average years of life lived under age 65 was only 2.2 years (59.8 years for males, 62.0 years for females).

Males and females have not shared equally in the reduction of mortality in this century, particularly at the older ages. In 1900-02, White females had a small advantage over White males in life expectation at birth (2.9 years). (See table 5-1.) Between 1900-02 and 1978, expectation of life at birth increased 22 years for White males and 27 years for White females; hence, about 5 years were added to the original difference of almost 3 years. Life expectation at age 65 showed gains between 1900-02 and 1978 of 2.5 years for White males and 6.2 years for White females, so that 3.7 years were added to the initial difference of less than 1 year.

Values for life expectation at birth for males and females have been showing about the same male-female difference since 1970, i.e., about 7.7 years. The corresponding figures for life expectation at age 65 show an increase of 0.6 year in the male-female difference between 1970 and 1978, from 3.8 years in 1970 to 4.4 years in 1978. There was an increase of 2.5 years in life expectation at birth for each sex in this period and a 1-year to 1½-year increase at age 65 for each sex (1.0 year for males and 1.6 years for females).

Since 1900-02, reductions in death rates for females have far outpaced those for males at the older ages. This difference in trend is reflected in the ratios of male to female death rates given in table 5-4. In 1900-02, death rates for males at the older ages were only slightly above those for females. The excess amounted to 6 percent for the ages 65 and over as a whole. The progressive divergence of the rates brought the relative difference to nearly 50 percent in 1980. The divergence of death rates for the sexes has occurred both for Whites and for Blacks and other races, although it has been slightly greater for Blacks and other races. Thus, there is now a large relative difference between the death rates of the sexes at ages 65 and over which is roughly similar for each of the two principal race groups.

The relative importance of genetic and "environmental" (nongenetic) factors in influencing the relative longevity of males and females cannot be easily established and is a matter of debate. The tendency for women to live longer than men may result largely or even wholly from differences in the environment, roles, and lifestyles of men and women.[36] Generally, males are engaged in the more stressful, physically demanding, and dangerous occupations. Many of the changes over time in the difference between male and female mortality are associated with social and environmental factors.[37] Cigarette smoking has been identified as a major contributor to the difference.[38]

There is also strong evidence supporting a biological basis for the difference in the mortality levels of the sexes. For example, male fetal and infant mortality, particularly neonatal mortality, is greater than female fetal and infant mortality. It is general among mammals for the males of the species to have a lower life expectancy than females. A study of mortality for male and female Catholic teaching orders, whose living conditions are nearly equal, tends to support the biological hypothesis.[39]

The divergence of male and female mortality has occurred in spite of the fact that some important differences in the lifestyles and roles of men and women have been diminishing. For example, women have been entering the labor force and adopting the habit of smoking in large numbers since World War II. Nevertheless, social factors appear to account for an important part of the difference directly, or indirectly by their influence on the interaction with genetic or biological factors. For example, women are less likely to smoke or to be heavy smokers than men, and women are more likely to secure earlier diagnosis and appropriate treatment for health conditions, including particularly the serious illnesses.

---

[36] Erdman Palmore and Frances C. Jeffers (eds.), *Prediction of Life Span*, D.C. Heath and Co., Lexington, Massachusetts, 1971, esp. pp. 283 and 285.

[37] Philip E. Enterline, "Causes of Death Responsible for Recent Increases in Sex Mortality Differentials in the United States," *Milbank Memorial Fund Quarterly*, Vol. 39, No. 2, 1961, pp. 312-328; Ingrid Waldron, "Why Do Women Live Longer Than Men?," Part 1, *Journal of Human Stress*, Vol. 2, No. 1, pp. 2-13, March 1976; Ingrid Waldron and Susan Johnston, "Why Do Women Live Longer Than Men?," Part II, "*Journal of Human Stress*, Vol. 2, No. 2, pp. 19-29, June 1976.

[38] Frank Godley and David Q. Kruegel, "Cigarette Smoking and Differential Mortality: New Estimates from Representative National Samples," paper presented at the annual meeting of the Population Association of America, Seattle, Washington, April 17-19, 1975; Robert D. Retherford, "Tobacco Smoking and the Sex Mortality Differential," *Demography*, Vol. 9, No. 2, 1972, pp. 203-216; Robert D. Retherford, *The Changing Sex Differential in Mortality*, Greenwood Press, Westport, Connecticut, 1975.

[39] Francis C. Madigan, "Are Sex Mortality Differentials Biologically Caused?," *Milbank Memorial Fund Quarterly*, Vol. 35, No. 2, 1957, pp. 202-203.

We may have a better basis at a future date for arriving at an answer to the question as to why women live longer than men if the present tendencies toward the diminution of the differences in the environment, roles, and lifestyles of men and women continue.[40] It may be recalled that the gap between male and female life expectancy at birth stopped increasing during the seventies. In the USSR, where there is less differentiation in the occupational roles of men and women than in the United States, however, there is an even greater gap in life expectation at birth in favor of females (10.0 years in 1971-72).[41] In Sweden, under similar circumstances, the gap is much smaller but the figures for males and females have shown no signs of converging.

One tentative hypothesis regarding the basis of the difference in life expectation of the sexes may be offered. A substantial part of the difference reflects the biological superiority of women. With the virtual elimination of the infective and parasitic diseases and the subsequent emergence of the "chronic degenerative" diseases (e.g., diseases of the heart, malignant neoplasms, and cerebrovascular diseases) as the leading causes, this biological superiority has been increasingly evidenced. For reasons that are not well understood, males succumb more frequently and more readily to most of the latter diseases. A physiological basis for this difference may lie partly in differences between the sexes in hormonal balance, the clotting process, and proneness to injury of the vascular lining. A psychological basis for the difference, giving rise to differences in personality structures and greater male risks of acquiring a cardiovascular disease, may lie in the very different ways in which boys and girls have been socialized vis-a-vis the work-or-perish ethic of our society.

Race differences. Life expectation at birth for Whites in 1978 (74.0 years) was well above that for Blacks and other races (69.2 years). Most of the difference is accounted for by the lower mortality of Whites at ages under 65. The difference between the races in average years of life lived from birth to age 65 in 1978 was about 2.5 years (61.3 for Whites and 58.8 for Blacks and other races), while the difference in life expectation at age 65 was only 0.3 year (16.4 for Whites, 16.1 for Blacks and other races). At age 75, life expectation for Blacks and other races was greater than that for Whites (11.2 years compared with 10.3 years).

The mortality gap between the races has been decreasing at a fast pace. For example, the gap in life expectation at birth was approximately 11 years in 1939-41. It fell to 6.7 years in 1969-71 and to 4.8 years in 1978.[42] Similar trends in race differences were evident for each of the sexes. Life expectation at birth for White males in 1939-41 exceeded that for Black and other races males by 10.5 years. This difference was reduced to 5.2 years in 1978. The difference between White females and Black and other races females fell even more in this period, from 11.7 years in 1939-41 to 4.2 years in 1978 (table 5-1).

On the basis of the figures given above for the life expectation of the races, it would be reasonable to expect Whites to have lower death rates under age 75 and higher death rates at the higher ages. According to the official statistics, this is essentially the case. The death rates of Blacks exceed those for Whites at ages 65 to 69, 70 to 74, and 75 to 79, but from ages 80 to 84 on, Blacks and other races appear to have the lower rates. Considering the differences in terms of 10-year age groups, we find that in 1980 the death rate for Blacks and other races was nearly one-quarter greater than the death rate for Whites at ages 65 to 74, 15 percent higher at ages 75 to 84, and about 43 percent lower at ages 85 and over (table 5-5). This general relationship also appears to "hold" when the data are considered separately for each sex, but the relative differences between the races at ages 65 to 74 and 75 to 84 differ greatly for males and females. For males, the death rate for Blacks and other races was 11 percent higher than that for Whites at ages 65 to 74 and about equal to that for Whites at ages 75 to 84. For females, the death rates for Blacks and other races were higher than those for Whites for both age groups, 40 percent for ages 64 to 74 and 20 percent for ages 75 to 84.

The magnitude, if not the direction, of the differences between the death rates of the races at the older ages is subject to uncertainty. The basic data for Blacks and other races appear to be subject to substantial error. (See appendix B, tables B-1 to B-4.) In part, the differences in recorded death rates of Blacks and Whites at the higher ages are a result of errors in the census data, especially coverage errors and misreporting of age of Blacks, and of errors in death registration, in particular misreporting of age of Blacks on death certificates. Rates based wholly on Social Security (Medicare) data agree with death rates based on registered deaths and postcensal population estimates in indicating a crossover of the rates for the two races. However, the crossover in the Social Security data occurs at a later age than in the registration statistics for females. The Social Security data also reflect much smaller differences between the races at the older ages. (See appendix B, table B-4.) The crossover phenomenon is not to be attributed mainly to reporting errors, however. Numerous paired comparisons of population groups within and between countries having data of good quality show the crossover phenomenon.[43] (See the section below for further discussion of crossover.)

---

[40] Palmore and Jeffers, *op. cit.*, p. 285.

[41] B. Garros and M.H. Bouvier, "Excès de la mortalité masculine en France et causes medicales de decès", *Population* (Paris), Vol. 33, No. 6, pp. 1095-1112, Nov.-Dec. 1978.

[42] None of these measures have been adjusted to take account of the 1980 census, which apparently counted the population more completely than the 1970 census, especially the Black population. Inasmuch as such an adjustment would tend to reduce the Black rates more than the White rates, the differences between the races are, in fact, smaller than indicated here. See appendix B.

Socioeconomic differences. Much of the difference between death rates for Whites and Blacks at the ages below 65 not explainable by errors in the data may be accounted for by differences in the socioeconomic status (i.e., occupation, education, and income) of the race groups. There is evidence of differences in death rates according to socioeconomic status. An analysis of deaths and death rates in the 4-month period, May-August 1960, based on a match of death certificates and census records conducted by Kitagawa and Hauser, indicates that, in general, death rates vary inversely with educational attainment, income, and occupational level, even when Whites and Blacks are considered separately.[44] This pattern is clearly shown for Whites aged 25 to 64 but applies somewhat less forcefully to Blacks aged 25 to 64 and to persons 65 and over.

The chances of reaching age 65 are clearly better for the more affluent, better educated, and more highly placed persons. According to the Kitagawa-Hauser study, the average years of life remaining at age 25 and at age 65 for White males and White females vary as follows according to years of school completed:[45]

Sex and years of school completed	Average years of life remaining at age:	
	25	65
White males:		
Elementary, 5 to 7 years. .	43.6	12.9
Elementary, 8 years	44.8	13.0
High school, 1 to 3 years. .	45.6	13.5
High school, 4 years.	46.0	12.9
College, 1 year or more. . .	47.1	13.1
White females:		
Elementary, 5 to 7 years. .	50.5	16.0
Elementary, 8 years	51.1	16.2
High school, 1 to 3 years .	53.4	18.0
High school, 4 years	52.2	16.3
College, 1 year or more. . .	56.4	20.8

In addition to socioeconomic status, other social, economic, and cultural factors may contribute to the difference between the death rates for the races. Genetic factors may also play a part; investigations have revealed that specific gene-linked diseases have an affinity for certain ethnic and racial groups.[46]

The relatively favorable mortality position of Blacks as compared with Whites above age 75 suggests that socioeconomic differences do not "operate" at the older ages as they do at the ages below 65. One explanatory hypothesis is that those Blacks who have survived the excessive environmental stresses of their younger years may be destined by natural selection to live an especially long life. We may see this as a modified version of a theory of the "survival of the fit." A refined version of this hypothesis has been offered by Manton. He attributes the crossover phenomenon to the effect of differential mortality selection on a heterogeneous population.[47] He reasons that, if the individuals in populations are heterogeneous with respect to their endowment for longevity, then a crossover or convergence of the age-specific mortality rates of two populations can occur if one population has markedly higher earlier mortality. The more robust make up a larger proportion of surviving Blacks at the older ages than is true for Whites, and hence, they have lower prevalence ratios at the higher ages.

CAUSES OF DEATH

"Diseases of the heart" far outranks any other cause of death among persons 65 years and over. Rates for ages 65 and over for the 10 leading causes of death in 1978 are shown in table 5-6. Malignant neoplasms (cancer) and cerebrovascular diseases (mainly stroke) hold second and third place, respectively. Taken together, these three causes accounted for 3 out of 4 deaths at ages 65 and over in 1978. Other leading causes, in rank order, are: influenza and pneumonia; arteriosclerosis; diabetes; accidents; bronchitis, emphysema, and asthma; cirrhosis of the liver; and nephritis and nephrosis. These are all far less frequent than the leading three causes, however.

Because of the low death rates at ages under 65 and the rather large proportion of older persons, the average age of persons dying from each of the leading causes is quite high. In 1978, the median age at death was 77 years for persons dying from the major cardiovascular diseases, 69 years for malignant neoplasms, 80 years for "influenza and pneumonia," 73 years for diabetes, and 72 years for "bronchitis, emphysema, and asthma." It was somewhat lower for cirrhosis of the liver (58 years) and much lower for accidents (35 years). For all causes combined, the median age of persons dying is now about 72 years; in 1900, when infectious and parasitic illnesses were much more common and the population was much younger, it was only about 36 years.

---

[43] Charles B. Nam and Kathleen A. Ockay, "Factors Contributing to the Mortality Crossover Pattern: Effects of Development Level, Overall Mortality Level, and Causes of Death," *Proceedings of the XVIII General Conference of the International Union for the Scientific Study of Population, Mexico City, August 8-13, 1977*; Kenneth G. Manton, Sharon S. Poss, and S. Wing, "The Black-White Mortality Crossover: Investigation from the Perspective of the Components of Aging," *The Gerontologist*, Vol. 19, No. 3, pp. 291-300, June 1979; and Charles B. Nam, Norman L. Weatherby, and Kathleen A. Ockay, "Causes of Death Which Contribute to the Mortality Crossover Effect," *Social Biology*, Vol. 25, No. 4, pp. 306-314, Winter 1978.

[44] Evelyn M. Kitagawa and Philip M. Hauser, *Differential Mortality in the United States: A Study in Socioeconomic Epidemiology*, Harvard University Press, Cambridge, Massachusetts, 1973, esp. pp. 11, 14, and 157.

[45] Kitagawa and Hauser, *op. cit.*, p. 17.

[46] Ailon Shiloh and Ida Cohen Selavan (eds.), *Ethnic Groups of America: Their Morbidity, Mortality, and Behavior Disorders*, Vol. I, *The Jews*, 1974, esp. pp. xv and xvi, and Vol. II, *The Blacks*, Charles C. Thomas, Publisher, Springfield, Illinois, 1975. See also Henry Rothschild (ed.), *Biocultural Aspects of Disease*, Academic Press, New York, 1981.

[47] Kenneth G. Manton, "Sex and Race Specific Mortality Differentials in Multiple Cause of Death Data," *The Gerontologist*, Vol. 20, No. 4, pp. 480-493, August 1980; Manton, Poss, and Wing, *op. cit.*

Sex and race variations. Death rates for males 65 years and over as a whole for diseases of the heart and malignant neoplasms are far greater than those for women, as shown by ratios of male death rates to female death rates for the leading causes of death at the older ages in 1978 (table 5-7). There is a considerable excess of male mortality also for "influenza and pneumonia," accidents, cirrhosis of the liver, "nephritis and nephrosis," and especially "bronchitis, emphysema, and asthma." On the other hand, the rates for cerebrovascular diseases, arteriosclerosis, and diabetes either show little preference for one sex or the other or are somewhat higher for women. For all 10 leading causes except diabetes, the rates for males at ages 65 to 74 and at ages 75 to 84 are well above those for females. At ages 85 and over, the rates for all leading causes except cerebrovascular diseases and diabetes are greater for males than for females.

Death rates for some leading causes for the ages 65 and over as a whole are rather similar for Blacks and other races and for Whites. The rates for Blacks are substantially or considerably lower, however, for diseases of the heart, "influenza and pneumonia," cerebrovascular diseases, cirrhosis of the liver, arteriosclerosis, and "bronchitis, emphysema, and asthma", and considerably higher for diabetes and "nephritis and nephrosis" (table 5-8). For cancer and accidents, the rates for Whites and Blacks differ relatively little.

The striking difference apparent between the relative levels of mortality for Whites and for Blacks and other races at ages 65 to 74, 75 to 84, and 85 and over are reflected in differences between the races in the major causes of death at different ages. The rates at ages 65 to 74 for all of the major causes of death except "bronchitis, emphysema, and asthma" and cirrhosis of the liver are substantially or considerably higher for Blacks than for Whites. At ages 75 to 84, the relative levels often went in different directions. The death rates of Blacks for cerebrovascular diseases, diabetes, and "nephritis and nephrosis" are substantially or considerably higher than those of Whites; the rates for "bronchitis, emphysema, and asthma" and cirrhosis of the liver are considerably lower, and the rates for the remaining leading causes (e.g., heart diseases, cancer) differ little. For ages 85 and over, the rates for all 10 leading causes except "nephritis and nephrosis" are much lower for Blacks than for Whites. As suggested earlier, the real shift from ages 65 to 74 to 85 and over may be less pronounced than is indicated by these figures, which are affected by errors of reporting both in the census and in the death registration.

Since 1968, there have been decreases in the death rates at ages 65 and over for nearly all leading causes of death. Only the rate for malignant neoplasms has shown a strong rise. Death rates from most leading causes fell for both men and women between 1968 and 1978. For most leading causes also (except for "bronchitis, emphysema, and asthma") death rates fell relatively more for women (i.e., cerebrovascular diseases, diseases of the heart, arteriosclerosis, accidents, diabetes, "influenza and pneumonia"). For two of the leading causes, malignant neoplasms and cirrhosis of the liver, the death rate increased for both men and women between 1968 and 1978 and the relative increase was greater for men. As a result, the relative difference between the death rates of males and females aged 65 and over for diseases of the heart, cancer, "influenza and pneumonia," diabetes, cerebrovascular diseases, arteriosclerosis, and cirrhosis of the liver has widened, and the difference has narrowed for "bronchitis, emphysema, and asthma." [48]

The net effect of these age, sex, cause-specific changes has been to widen the gap slightly between the death rates of males and females for ages 65 and over between 1968 and 1978. Death rates for age groups 55 and over for the 10 leading causes, according to sex, for 1978, and the percent change, 1968-78 and 1954-68, are shown in table 5-9.[49]

Cause-specific analysis by life tables. Some diseases have been virtually eliminated, statistically speaking, since they contribute little to the total death rate. Their actual elimination would add very little to life expectancy. For instance, according to life tables for 1978, [50] if tuberculosis were eliminated completely, there would be a mere 0.02-year gain in life expectancy at birth (table 5-10). On the other hand, if the major cardiovascular diseases (principally, diseases of the heart, cerebrovascular diseases, and arteriosclerosis) were eliminated, there would be a 13.9-year gain in life expectancy at birth and a 14.3 year gain in life expectation at age 65. The corresponding figures for the heart diseases, the major component of the cardiovascular category, are 7.0 years and 6.6 years. Malignant neoplasms ranks second with respect to the possible gain in expectation of life at birth that would be realized if a category of diseases were eliminated. The gain would be 3.1 years. Since this cause affects a wide span of ages, the gain at age 65 would be much less (1.9 years). The gain at birth from eliminating any other major category amounts to less than one year, e.g., 0.4 year for influenza and pneumonia.

---

[48] See also C. H. Patrick, Y. Y. Palesch, M. Feinleib, and J. A. Brody, "Sex Differences in Declining Cohort Death Rates from Heart Diseases," *American Journal of Public Health*, Vol. 72, pp 161-166.

[49] See also U.S. Public Health Service, National Center for Health Statistics, "Mortality Trends for Leading Causes of Death, United States, 1950-69," by A.J. Klebba, J.D. Maurer, and E.J. Glass, "*Vital and Health Statistics*, Series 20, No. 16, March 1974, and "The Change in Mortality Trends in the United States," by Iwao M. Moriyama, *Vital and Health Statistics*, Series 3, No. 1, March 1964, U.S. Public Health Service, National Center for Health Statistics, *Facts of Life and Death*, DHEW Publication No. (PHS) 79-1222, November 1978.

[50] Unpublished study prepared by Prithwis Das Gupta of the U.S. Bureau of the Census, "Cause-of-Death Analysis of the 1978 U.S. Mortality Data by Age, Sex, and Race," 1981.

According to the life tables eliminating various causes of death for 1978, a newborn infant has a 55-percent chance of eventually dying from a major cardiovascular disease and a 19-percent chance of eventually dying from cancer (table 5-11). The probabilities of eventually dying from the heart diseases and cerebrovascular diseases, the principal components of the former category, are 41 percent and 10 percent, respectively. The probability at birth of eventually dying from any other particular cause is less than 5 percent.

Death rates at ages below 65, except infancy, have fallen so low that the chances of eventually dying from most of the major causes are not grossly different at age 65 from the chances of eventually dying from them at birth. The chances of eventually dying from the major cardiovascular diseases and, in particular, from diseases of the heart are somewhat higher (62 percent and 45 percent, respectively) at age 65 than at birth because of the great concentration of these diseases in later life. On the other hand, the chances of eventually dying from cancer are slightly lower at age 65 than at birth (17 percent and 19 percent, respectively) because of the more even age distribution of the incidence of cancer.

The life tables eliminating various causes of death for 1978 and the corresponding tables for 1969-71 published by the National Center for Health Statistics imply small changes between 1969-71 and 1978 in the gains in life expectancy that would result from eliminating such leading causes of death as the major cardiovascular diseases, neoplasms, and influenza, pneumonia, and bronchitis, and in the probability of eventually dying from these causes.[51] The gains in life expectancy at birth and at age 65 from eliminating the diseases of the heart in 1978 (7.0 and 6.6 years, respectively) are greater than those for 1969-71 (5.9 and 5.1 years, respectively). The gain for malignant neoplasms for 1978 was 0.6 year greater than that for 1969-71 (3.1 versus 2.5 years).

The elimination of the cardiovascular diseases or cancer would result in major additions to population size, since survivorship in the older ages particularly would improve. The number of persons at the older ages and the proportion at the older ages, under conditions of constant fertility, would increase greatly.[52]

GEOGRAPHIC VARIATIONS

Death rates for States show a steady, rapid convergence from at least 1929-31 (when the first complete set of life tables for States was prepared) to 1959-61. By 1959-61, the variation in life expectation at birth and at age 65 among the States had become rather small, and since that date, the variation in death rates among the States has changed little. Specifically, the variation in life expectation at birth around the U.S. average in 1969-71 (70.8 years) was very similar to that around the U.S. average in 1959-61 (69.9 years), particularly if each sex-race group is considered separately. (Corresponding life table values are not yet available for 1979-81, but the change in the variation of mortality among the States between 1970 and 1978 may be inferred from a comparison of death rates for these years.) This variation may be represented by the mean (average) deviation of the values for States around the unweighted mean (average) of all the values. The mean deviation for life expectation at birth was 1.2 years in 1969-71 and 1.1 years in 1959-61 (table 5-12). The values for life expectation at birth for the best State and the worst State differed from each other by 8 years in 1969-71, but given the large race difference in life expectancy, much of this State variation results from differences in race composition.

The West North Central Division appears to have the most favorable position with respect to life expectancy at birth and the East South Central Division the least favorable one, even though the geographic differences are small (table 5-13). The leading States in 1969-71 were Hawaii, Minnesota, Utah, North Dakota, and Nebraska, and the lagging States were the District of Columbia, South Carolina, Mississippi, Georgia, and Louisiana. With respect to expectation of life at age 65, most States in the West Region (i.e., Mountain and Pacific Divisions), the West North Central Division, and the West South Central Division exceeded the national figure, while most States in the Northeast Region (i.e., New England and the Middle Atlantic Divisions) and in the East North Central, the South Atlantic, and East South Central Divisions fell below the national average.

By 1969-71, expectation of life at birth for the leading State had reached 77.3 years for White females and 69.6 years for White males (table 5-12). The corresponding figures for Blacks were much lower, 72.3 years for females and 63.7 years for males. As in the case of the United States as a whole, the "best" State showed little difference between the races in life expectancy at age 65: 18.2 years for White females vs. 17.5 years for Black females, 14.2 years for White males vs. 14.3 years for Black males. The figures for 1969-71 indicate a greater variation among the States for Blacks than for Whites in death rates below age 65 but about the same (small) variation for each race group above age 65. The mean deviation in life expectation at birth for States in 1969-71 was about 0.7 year for Whites and 1.0 year for Blacks; the corresponding figures at age 65 were 0.4 and 0.5 year. Depending on sex and race, expectation values at birth for the worst State were 3½ to 5½ years lower than for the best State. Expectation values at age 65 for the worst state were 2 to 2½ years lower than for the best State (table 5-12).

---

[51] U.S. Public Health Service, National Center for Health Statistics, "United States Life Tables by Causes of Death, 1969-71," by T.N.E. Greville, Francisco Bayo, and Richard S. Foster, *United States Life Tables, 1969-71*, Vol. 1, No. 5, May 1975. See also: U.S. Public Health Service, National Center for Health Statistics, "United States Life Tables by Causes of Death, 1959-61," by T.N.E. Greville, *Life Tables, 1959-61*, Vol. I, No. 6, 1968. Samuel Preston, Nathan Keyfitz, and Robert Schoen, *Causes of Death: Life Tables for National Populations*, Seminar Press, New York, 1972, pp. 768-771.

[52] For an extended discussion of the demographic and social consequences of the elimination of various causes of death, see Samuel Preston, *Mortality Patterns in National Populations, With Special Reference to Recorded Causes of Death*, Academic Press, New York, 1976, especially chapter 7.

PROSPECTS FOR MORTALITY REDUCTION

Changes in the number of elderly persons depend in part directly on progress in reducing death rates at the various ages, the younger ages as well as the older ones. In assessing the possibilities for future increases in the number of elderly persons, we are interested, therefore, in the prospects for reduction of death rates throughout the age scale.

Methodology. A number of different approaches to the task of projecting death rates for the United States may be taken. One is to extrapolate past trends in mortality experience in the United States in terms of age-sex-race-specific death rates. In this connection, it is useful to consider the prospects for reducing the gap between the rates for the sexes and the races. The extrapolation may be carried out either on a period or cohort basis.

Another approach is to consider the change in death rates in more analytical terms, for example, in terms of cause of death or, at a more basic level, in terms of the factors affecting specific causes of death. The latter would involve consideration of elements in personal habits or life style (e.g., eating breakfast, smoking, sleeping habits, dietary habits, alcohol consumption, auto driving practices, obesity, exercise) and environmental conditions (e.g., working conditions, extent of environmental pollution).[53] Judgment would then be brought to bear on the possibilities for reducing the rates for particular causes of death or on the influence of particular disease-related conditions.

Some reductions in the rates for the major causes of death could be achieved, for example, by extending the application of present medical knowledge relating to the prevention, diagnosis, and treatment of the major illnesses through health education efforts and public information campaigns (e.g., relating to personal habits, blood pressure testing, use of prescribed medication, breast self-examination), a change in the financing and delivery of medical care (e.g., extension of health insurance programs, redistribution of health personnel, and facilities to increase services in rural areas and inner cities), and programs to improve the competence of health personnel. Significant gains would be secured by measures that would increase and/or maintain the competence of physicians and other health practitioners, such as through better training and qualification programs and requirements for retraining and reevaluation of those in practice. Focusing the attention of the public on the concept of personal responsibility for one's health and on the practice of personal hygiene and safety at work and at home would also be expected to have a signficant impact. In addition, there is the possibility of developing new diagnostic and treatment procedures for specific conditions and the possibility of devising techniques for slowing the aging process.

The U.S. Public Heath Service has estimated that lifestyle, the environment, and the health care delivery system account for approximately three-quarters of the mortality in the United States from heart disease, cancer, cardiovascular disease, and arteriosclerosis.[54] Lifestyle alone accounts for 54 percent, 37 percent, 50 percent, and 49 percent of the mortality from these diseases, respectively. A study by Belloc and Breslow and a follow-up study by Wiley and Camacho reported that 45-year-old men who practiced seven healthful habits (exercising regularly, maintaining moderate weight, not eating snacks, eating breakfast, not smoking, drinking moderately, sleeping at least 7 hours a day) would gain several years of life over those practicing three or fewer of these habits.[55]

In this connection, it is useful to consider the competing risks of death. Because of the interdependence of the risks of death from various causes, changes in the pattern of mortality rates according to cause would result from eliminating or sharply reducing deaths from certain causes. If deaths from a particular cause (e.g., cancer) were eliminated or sharply reduced, those saved would immediately be subject to death from other causes (e.g., diseases of the heart), and as a result, the rates from these other causes would tend to rise, particularly if the average age of death from the two cause-categories is close.[56] Furthermore, multiple causes are often involved in the event of death; with the elimination of one cause, the other(s) may account for death with only a short lag. Data on deaths classified according to multiple causes are being compiled for the first time by the National Center for Health Statistics,[57] demographic implications of multiple-cause mortality are being analyzed,[58] and the mathematics of competing risks is being explored.[59]

---

[53] See Mervyn Susser, "Industrialization, Urbanization, and Health: An Epidemiological View," pp. 273-303, and Elena Nightingale, "Prospects for Reducing Mortality in Developed Countries by Changes in Day-To-Day Behavior," pp. 207-232, in "*International Population Conference, Manila, 1981*," International Union for the Scientific Study of Population, Liege, 1981.

[54] U.S. Public Health Service, Center for Disease Control, *Ten Leading Causes of Death in the United States, 1978*; and Clifford C. Clogg, "The Effect of Personal Health Care Services on Longevity in an Economically Advanced Population," *Health Services Research*, Vol. 14, pp. 5-32, 1979.

[55] N. B. Belloc and L. Breslow, "Relationship of Physical Health Status and Health Practices," *Preventive Medicine*, Vol. 1, pp. 409-421, 1972; J.A. Wiley and T.C. Camacho, "Life Style and Future Health; Evidence from the Alameda County Study," *Preventive Medicine*, Vol. 9, pp. 1-21, 1980.

[56] Conrad Taeuber, "If Nobody Died of Cancer...," *The Kennedy Institute Quarterly Report*, Vol. 2, No. 2, Summer 1976, pp.6-9; and Nathan Keyfitz, "What Difference Would it Make if Cancer Were Eradicated? An Examination of the Taeuber Paradox," *Demography*, Vol. 14, No. 4, pp. 411-418, November 1977.

[57] Harry D. Rosenberg, "National Multiple Cause of Death Statistics," paper prepared for presentation at the 17th Biennial Meeting of the Public Health Conference on Records and Statistics, Washington, D.C., June 5-7, 1978.

Still another procedure for projecting death rates in the United States is to postulate that the United States will attain the level of the most advanced areas, either a State of the United States or foreign country, or some analytical extension of that level, at some specified future date. This concept can theoretically be extended to encompass socioeconomic class differences and race/ethnic differences. We can consider the outlook for longevity on the assumption of the extension of existing methods of health care and treatment to geographic and socioeconomic segments of the population not now fully covered or not experiencing the lowest rates. (The assumption of complete convergence of male and female death rates as a technique for establishing future overall death rates does not appear to be realistic in view of the evidence regarding the basis of the differences.) Furthermore, one can consider composite mortality patterns combining the record of the best State or foreign country at each age or reasonable extension of these rates.

Interstate and international variations. In considering the record of the best State as a guide to possible progress for the United States, we refer to the latest available set of life tables for states published by the National Center for Health Statistics, those for 1969-71. (See table 5-12.) Life expectation at birth was highest in Hawaii (73.6 years). This figure exceeds the figure for the United States as a whole (70.8 years) by 2.8 years. The best expectation of life at age 65 (16.2 years), also for Hawaii, exceeds the U.S. figure (15.0 years) by merely 1.2 years. These differences suggest little room for improvement before the United States is as well off as the best State. A similar comparison for sex-race groups indicates that the difference between life expectation at birth for males in the United States (67.0) and White males in the best State (69.6) (selected from 48 States, excluding Alaska, Hawaii, and the District of Columbia) is only 2.6 years. The difference between females in the United States (74.6) and White females in the best State (77.3) is 2.7 years. At age 65, the corresponding differences for males and females are also small and about equal for the sexes (1.3 years). Comparisons are made here between all races in the United States and Whites in the best State on the assumption of eventual convergence of mortality for the races.

Actual changes in the sixties did not move the observed values in 1960 any closer to the "targets" for males in 1970, but some progress was made for females. Although these figures suggest that progress in reducing U.S. average mortality toward the level of the leading States would not result in a continuation of the historical trend of increasing disparity between the death rates of males and females, no substantial convergence is suggested either.

Greater possible improvement is suggested by the experience of the countries with the lowest mortality, in particular certain countries of northwestern Europe, Japan, Australia, and New Zealand. Norway may be selected as the single country with the best overall record, although its death rates are not the lowest at all ages (table 5-15). Expectation of life at birth for females in Norway for the period 1975-76 was 78.1 years, as compared with 76.7 years for females in the United States in 1976 (table 5-16). The advantage in favor of Norway was only 1.4 years. On the other hand, expectation of life at age 65 for females in the United States (18.0 in 1976) exceeded the figure for Norway (17.4 in 1975-76) by 0.6 years. Generally, death rates for females in the United States are higher than those for females in Norway at ages under 65 and are lower at ages 65 and over. For males, the United States disadvantage in expectation of life was greater than for females, especially at birth. Life expectancy at birth for males in Norway, 71.9 years, exceeded the United States figure, 69.0 years, by 2.9 years; at age 65, the figure for Norway, 14.1 years, was 0.4 year higher than the United States figure of 13.7 years.

If, further, we combine the lowest death rates at each age in 1976 for the countries with reliable data into a single hypothetical life table, the possibility of additional increases in life expectation in the United States is suggested. The differences between the United States and the best-country composite are only moderate,however. The values for life expectation for females in the composite table are 79.4 years at birth and 18.5 years at age 65, implying differences of 2.7 years and 0.5 year over the corresponding U.S. values (table 5-16). Differences for males are a little larger, although, of course, the expectancy values themselves are much lower for males than for females. The best-country composite figures for males are 73.4 years at birth and 14.6 years at age 65, implying differences of 4.4 years and 0.9 year over the corresponding U.S. values.

As an approach to the measurement of the limit of the decline in mortality imposed by the human constitution, Bourgeois-Pichat has examined the levels of endogenous mortality in Norway, a country which, as we have noted, has some of the lowest recorded age-specific death rates.[60] Endogenous causes of death are those which, presumably, have an essentially genetic or biological basis and are less amenable to control; they differ from the exogenous causes, which have an essentially environmental or social basis. The classification of a cause of death as exogenous or endogenous has a partially arbitrary basis; in Bourgeois-Pichat's scheme endogenous mortality encompasses all mortality except that due to infectious and parasitic diseases, respiratory diseases, and accidents, poisonings, and violence.

---

[58] K.G. Manton, H.D. Tolley, and S.S. Poss, "Life Table Techniques for Multiple Cause Mortality," *Demography*, Vol. 13, No. 4, pp. 541-564, November 1976; and Kenneth G. Manton and Sharon S. Poss, "Effects of Dependency among Causes of Death for Cause Elimination of Life Table Strategies," *Demography*, Vol. 16, No. 2, pp. 313-327, May 1979.

[59] U.S. Public Health Service, National Center for Health Statistics, "On the Mathematics of Competing Risks," by Z. William Birnbaum, *Vital and Health Statistics*, Series 2, No. 77, January 1979.

[60] Jean Bourgeois-Pichat, "Essai sur la mortalité 'biologique' de l'homme," *Population* (Paris), Vol. 7, No. 3, pp. 381-394, July-Sept. 1952; "Future Outlook for Mortality Decline in the World," in *Prospects of Population: Methodology and Assumptions* (Papers of the *Ad Hoc* Group of Experts on Demographic Projections), *Population Studies*, Series A, No. 67, New York, United Nations, 1979; and "La transition démographique: Vieillissement de la population," pp. 211-239, in *Population Science in the Service of Mankind*, Conference on Science in the Service of Life sponsored by the Institute of Life and the International Union for the Scientific Study of Population, Vichy, France, 1979.

Using Bourgeois-Pichat's definition of endogenous mortality, we have computed "limits" to life expectation at birth for Norway in 1973 of 79.6 years for females and 74.1 years for males and limits at age 65 of 18.2 years for females and 14.9 years for males. These are, of course, provisional limits which could change with future advances in medicine or, more important, "socioeconomic" advances. Evidence of this capability for change may be seen in new limits to life expectation at birth calculated for Norway in 1977 of 80.7 years for females and 75.0 years for males and limits at age 65 of 19.4 years for females and 15.7 years for males. The limits for life expectation at birth for both males and females have nearly been "achieved" by the best-country composite (79.4 years and 73.4 years, respectively). The limits for expectation of life at age 65 for Norway in 1977 are approximately 1 year greater than those achieved by the best-country composite for both males and females.

Bourgeois-Pichat's figures for 1973 and 1977 can be compared with his previous figures for the "biological limit" of mortality in 1949.[61] It is significant not only that the limits of life expectation have changed but that the male figure has fallen. Specifically, the levels of life expectancy at birth for 1977 based on endogenous mortality are lower for males and higher for females than the figures presented by Bourgeois-Pichat for 1949. More recently, in spite of the rise in endogenous mortality for males between 1952 and 1977, Bourgeois-Pichat has suggested the possibility of major declines in the death rates from the endogenous causes on the basis of current and prospective research in molecular biology designed to delay the aging process.[62]

What appears attainable with respect to the reduction in mortality is clearly a shifting thing, as the domains and levels of endogenous and exogenous mortality shift. Calculations of limits to life expectation based on endogenous mortality are subject to question because it is impossible to make an exact separation between endogenous and exogenous mortality. Some exogenous causes of mortality (e.g., accidents) cannot be assumed to decline to extinction, and changes in life style, improvements in health care, and medical progress may contribute to a reduction, if not control, of some endogenous causes. Nevertheless, such calculations do provide some indication of the prospects implicit in the present cause structure of deaths.

The gap between life expectation at birth in the United States and the limit for Norway in 1977 is substantial for both males and females, averaging 4.6 years. At age 65, however, the difference for both males and females is much less, averaging only 1.4 years.

On the basis of the brief analysis of State and foreign data, including the analysis of endogenous mortality, presented above, we can conclude that there is little reason to expect major increases in life expectation in the United States in the next few decades.[63] The pace of the decline in death rates at the older ages is expected to slacken although we should continue to see an increasing rectangularization of the survival curve. We can hypothesize that, with present knowledge, a life expectancy at birth of 82 years for females and 76 years for males, and a life expectancy at age 65 of 21 years for females and 17 years for males, is attainable in the United States in the next quarter century. Even so, reaching the target cited for males on life expectancy at birth may be quite difficult.

Prospects for convergence of male-female death rates. Male-female differences in life expectation at birth are substantial in all countries with low mortality (table 5-17). Norway showed a difference of 6.2 years in 1975-76 as compared with a difference of 7.7 years in the United States in 1976 and 1978, and the best-country-composite showed a difference of 6.0 years. Differences for countries with low mortality varied from 3.6 years (Israel) to 9.2 years (USSR). Differences for States in the United States in 1969-71 are consistently high, varying only little around the national average of 7.6 years (from 5.8 years for Hawaii to 9.0 for Wyoming). (See table 5-13.)

An examination of trends in sex differences for life expectation at birth, covering several European countries with smaller differences (about 6.0 years) than the United States, was made to determine whether the current differences in life expectation between the sexes in these countries are the result of a convergence from higher differences in the past. This examination revealed that, except for minor fluctuations, the male-female differences in life expectation at birth had never been higher than at present. This finding, along with the figures in tables 5-13, 5-16, and 5-17, suggests that the male-female gap in life expectation for the United States will continue to remain large though it may narrow somewhat.

More generally, historical and comparative analysis suggests no great convergence of male and female mortality or life expectation in the United States in the near future. This hypothesis is consistent with the view that at least a substantial part of the difference reflects the biological superiority of women. The limits to expectation of life for

---

[61] Bourgeois-Pichat, *op. cit.*, 1952.

[62] Jean Bourgeois-Pichat, "Commentaries" on the paper by A. J. Fox, pp. 562-566, in *Proceedings of the Meeting on Socioeconomic Determinants and Consequences of Mortality, Mexico City, June 1979*, Geneva, World Health Organization, 1981.

[63] For a different view, see Richard A. Kalish, "Added Years: Social Issues and Consequences," pp. 273-280, in Erdman Palmore and Frances C. Jeffers (eds.), *Prediction of Life Span*, D.C. Heath and Co., Lexington, Mass. 1971, and Eileen M. Crimmins, "Recent and Prospective Trends in Old Age Mortality," paper presented at the annual meeting of the American Association for the Advancement of Science, May 26-31, 1983, Detroit, Michigan.

Norway in 1977 based on endogenous mortality imply only a slight convergence of male and female mortality (5.7 years) as compared with the actual difference for Norway in 1977 (6.5 years).

A tenable hypothesis regarding the prospects for convergence of male and female death rates in the United States is that the difference has reached an approximate maximum and will decline gradually by a modest amount over the next few decades, with the death rates of males remaining indefinitely well above those of females. Substantial convergence of male and female death rates in the foreseeable future is now considered highly unlikely.[64] This hypothesis rules out successful genetic intervention favoring males or widespread deleterious environmental influences particularly affecting women; we anticipate neither of the latter developments.

Evaluation of past projections. The Office of the Actuary, Social Security Administration (SSA), has been preparing projections of mortality for a sufficient past period to make possible some assessment of their results. In all of these projections, the basic method of the Social Security Administration has been to analyze the trend of death rates specific in terms of age, sex, and cause of death (10 major groups) and then to exercise judgement as to the probable percentage decreases in these rates by the year 2050 or the terminal date, taking into account prospective social, cultural, and medical developments. Either one, two, or three series of projections were prepared.

The projections of death rates made in 1957 by the Social Security Administration (Actuarial Study No. 46) proved to be rather consistent with actual developments to date. Indeed, the high and low projections of life expectancy based on the low and high mortality assumptions generally encompass the actual figures for 1978, as shown in table 5-18. An exception is life expectancy for females at age 65, for which both the high and low projected figures fell below the actual 1978 figures. The projections made in 1966 by the Social Security Administration (Actuarial Study No. 62), however, consistently fall below the actual figures for expectation of life at birth and at age 65 in 1978 (table 5-18). This result is a reflection of SSA's heavy reliance on the most recent trend in mortality in formulating the assumptions for the future, namely the sharp slowdown in the rate of mortality improvement experienced during the late 1950's and early 1960's.

More recent projections of death rates for the United States were published by the Social Security Administration in 1978 and 1981 (Actuarial Study No. 77 and Actuarial Study No. 85).[65] The projections in Actuarial Study No. 77 reflect small increases in life expectation at birth and at age 65 between 1977 and 2050:

Age and sex	1977[1] (base year)	2000	2050	Increase 1977-2000	Increase 1977-2050
At birth:					
Male . . .	69.4	70.3	71.7	0.9	2.3
Female .	76.8	78.0	80.4	1.2	3.6
At age 65:					
Male . . .	14.1	14.6	15.5	0.5	1.4
Female .	18.1	18.9	20.5	0.8	2.4

[1] Estimated by the Social Security Administration on the basis of preliminary estimates of death rates for 1977.

They imply an increase of only about 1 year in life expectation at birth and ⅔ year in life expectation at age 65 by the year 2000 and additional increases of about 2 years and 1⅓ years, respectively, between 2000 and 2050. The resulting projections of life expectation in 2050 are 80½ years at birth and 20½ years at age 65 for females and 71½ years at birth and 15½ years at age 65 for males. The figures imply greater increases in life expectation for females than for males. The assumption of modest future reductions in mortality essentially reflects the average trend during the two decades preceding the base year, 1977.

The latest set of projections of mortality issued by the Social Security Administration (1981) differ from past projections in providing three series of figures and a wide range (series I to III) as an uncertainty interval, including one series showing large increases in life expectation. The projections of life expectancy at birth and at age 65 made by the Social Security Administration are as follows:

Year and series	At birth Male	At birth Female	At age 65 Male	At age 65 Female
2000				
I.	71.4	79.4	15.0	19.8
II	72.9	81.1	15.8	21.1
III	75.9	84.9	17.4	24.2
2050				
I.	72.4	80.6	15.7	20.1
II	75.0	83.6	17.3	23.2
III	80.2	90.6	20.8	29.3

---

[64] For a different view, see Sidney Cobb and John P. Fulton, "An Epidemiologic Gaze into the Crystal Ball of the Elderly," in Sara B. Kiesler, James N. Morgan, Valerie K. Oppenheimer (eds.), *Social Change*, volume in James G. March (ed.), *Aging* (three vols.), Academic Press, New York, 1981.

[65] U.S. Social Security Administration, Office of the Actuary, "United States Population Projections for OASDHI Cost Estimates," *Actuarial Study*, No. 77, by Francisco R. Bayo, Howard W. Shiman, and Bruce R. Sobus, July 1978; U.S. Social Security Administration, Office of the Actuary, "Social Security Area Population Projections, 1981," *Actuarial Study*, No. 85, by Joseph F. Faber and John C. Wilkin, July 1981.

In series III, the series with the highest life expectation at birth, the figure would rise from 70 to 80 years for males and from 78 to 91 years for females between 1980 and 2050 (table 5-19); total life expectation at age 65 (including the 65 years lived) would rise from 79 to 86 years for males and from 84 to 94 years for females. In the light of the sharp fluctuations in the rate of decline of death rates in the last several decades and the special purpose of the SSA projections (calling for projection of the maximum likely level of life expectancy and the proportion of the elderly), such high target values may not be unreasonable. These targets far exceed the biological limits as determined on the basis of data for Norway in 1977.

The latest Census Bureau mortality projections (Current Population Reports, Series P-23, No. 922) correspond to those of the Social Security Administration in part. The high and middle series agree with series I and II; the low series represents a moderation of the trend of series III. None of the projections reflect a continuation of the rapid downward trend of the 1968-81 period.

SOME THEORETICAL CONSIDERATIONS

Interpretation of cause-eliminated life tables for projections. The fact that persons at age 65 would live 10 years longer on the average than they are now slated to live if the major cardiovascular diseases were eliminated does not provide a useful basis for projections of mortality. It should be clearly recognized that life tables with the causes of death eliminated which serve as a basis for such estimates of gains in life expectation are merely analytical tools, providing guides as to where it may be most effective to apply effort in extending life expectation. It hardly needs to be stated that the major cardiovascular diseases are not likely to be eliminated in the foreseeable future although death rates from these causes may be reduced somewhat.[66]

Persons who are saved from death due to a particular cause or combination of causes (e.g., malignant neoplasms) must eventually die of some other cause or causes, including possibly some new causes to be identified. If deaths from a particular cause are eliminated, age-specific death rates for some other causes and possibly also general age-specific death rates may rise because of the effect of multiple-cause mortality,the competing risks of death, and the limited human life span. Without an extension of human life span age-specific death rates must rise at some ages, or, at least, reattain 1.0 at this theoretical age limit. More likely, until life expectation approximates life span more closely, general age-specific death rates at most or all ages would continue to decline as a result of the elimination of deaths from some cause or causes or the reduction in rates from a variety of causes. More individuals would survive to the older ages and, hence, more persons would die of the existing causes in spite of the lower death rates.[67]

This combination of facts explains the seeming paradox that general age-specific death rates and age-specific death rates for particular causes may continue to decline while the chances of eventually dying from these causes (i.e., the number dying from a disease per 100 persons in the original cohort) may increase. An important element in measuring the effect of eliminating a particular cause of death on the death rates for other causes is the gap in years between the modal ages of incidence of the cause eliminated and the other causes. This gap is small for cancer and the cardiovascular diseases. Hence, elimination of cancer would tend to "produce" a rise in the death rate from cardiovascular diseases only a few ages (years) later.[68]

Effect of zero mortality. It is useful to consider the effects of extreme assumptions of mortality change on future population size and age distribution. The immediate effect on the growth rate of the total population would be quite pronounced if death rates rates fell to zero and life expectancy at birth was "infinite" rather than about 74 as at present. The growth rate would abruptly increase by the size of the death rate. In the long run, the rate of population growth would hardly be increased, however.[69] If population projections are made on the basis of population estimates for 1981, under conditions of subreplacement-level (middle) fertility and a small regular flow of immigrants (middle immigration), such as now roughly characterize the United States population, the immediate achievement of zero death rates would result in a growth rate of about 1.8 percent in the first projection year, 1981-82 , 1.3 percent in the year 1999-2000, 1.0 percent in the year 2024-25, and 0.8 percent in the year 2049-50, as compared with an "actual" growth rate of 0.9 percent in 1980-81 and a "middle" growth rate of 0.4 percent in 2049-50.[70]

How much faster would the elderly population and the proportion of elderly persons grow if no one died? After the initial tremendous impact of the shift to zero mortality, the annual growth rate of the elderly population would begin to revert to its former level. The population 65 years and over increased by 2.1 percent in 1980-81. With zero death rates the growth rate would jump to 7.3 percent in the first projection year and then gradually fall back to 3.4 percent in 1999-2000, 3.1 percent in 2024-25, and 1.7 percent in 2049-50.

---

[66] See P.R.J. Burch, "What Limits Life Span?", pp. 31-56, in B. Benjamin, P.R. Cox, and [illegible] Peel (eds.), *Population and the New Biology*, Academic Press, New York, 1974.

[67] This fact may be illustrated by a hypothetical life table in which no one dies before age 85 and in which death rates between age 85 and some age such as 110, when death is a certainty, rise from 0.0 to 1.0 but are always below the present recorded rates until age 110. Since death rates below age 85 have fallen to zero, 100,000 persons survive to age 85. Then, even with lower death rates above age 85, because of the larger surviving population, much larger numbers of persons would die at the higher ages from the various diseases of later life than in current life tables, until the cohort is extinct by age 110.

[68] Conrad Taeuber, "If Nobody Died of Cancer ..." *The Kennedy Institute Quarterly Report*, Vol. 2, No. 2, Summer 1976, pp. 6-9, and Nathan Keyfitz, "What Difference Would It Make If Cancer Were Eradicated? An Examination of the Taeuber Paradox," *Demography*, Vol. 14, No. 4, November 1977, pp. 411-418.

[69] See also Ansley J. Coale, "Increases in Expectation of Life and Population Growth," *International Population Conference, Vienna, 1959*, International Union for the Scientific Study of Population, pp. 36-41.

[70] These calculations were made by the authors on the same basis as the "middle" projections of the U.S. Bureau of the Census given in Current Population Reports, Series P-25, No. 922, except for the modification of the mortality assumption.

Of more importance is the effect on the age composition of the population of the immediate elimination of deaths. Since, with a current life expectancy of 74 years, any large reductions in death rates would be limited to the ages over 60, the elimination of deaths would tend to add greatly to the proportion of the population in the older ages. These conditions would result in a rise of the proportion 65 years and over from 11 percent in 1981 to 22 percent in 2000, 38 percent in 2025, and 50 percent in 2050. If zero death rates were achieved more gradually (e.g., by the year 2050), the proportion 65 years and over would rise to about 14 percent in 2000, 29 percent in 2025, and 44 percent in 2050. Once mortality had been reduced to very low levels, variable changes in age-specific death rates (i.e., changes in the age pattern of mortality) would have a negligible effect on age structure and further changes in age structure would depend almost wholly on the level of fertility.[71] With very low fertility (e.g., total fertility rate, 1.0), the proportion of persons aged 65 and over would tend to rise sharply; with high fertility (e.g., total fertility rate, 4.0), the proportion would tend to be depressed and, over a long period, would be quite small.

---

[71] Ansley J. Coale, "Age Composition in the Absence of Mortality and in Other Odd Circumstances," *Demography*, Vol. 10, No. 4, Nov. 1973, pp. 537-542.

Table 5-1. Average Remaining Lifetime at Various Ages, by Sex and Race: 1900 to 1978

Exact age, race, and sex	1978[1]	1968	1954	1939-41	1929-31	1900-02
ALL CLASSES						
At birth	73.3	70.2	69.6	63.6	59.3	49.2
65 years	16.3	14.6	14.4	12.8	12.3	11.9
75 years	10.4	9.1	9.0	7.6	7.3	7.1
80 years	8.1	6.8	6.9	5.7	5.4	5.3
WHITE						
Male:						
At birth	70.2	67.5	67.4	62.8	59.1	48.2
65 years	14.0	12.8	13.1	12.1	11.8	11.5
75 years	8.6	8.1	8.2	7.2	7.0	6.8
80 years	6.7	6.2	6.3	5.4	5.3	5.1
Female:						
At birth	77.8	74.9	73.6	67.3	62.7	51.1
65 years	18.4	16.4	15.7	13.6	12.8	12.2
75 years	11.5	9.8	9.4	7.9	7.6	7.3
80 years	8.8	7.0	7.0	5.9	5.6	5.5
BLACK AND OTHER RACES[2]						
Male:						
At birth	65.0	60.1	61.0	52.3	47.6	32.5
65 years	14.1	12.1	13.5	12.2	10.9	10.4
75 years	9.8	9.9	10.4	8.2	7.0	6.6
80 years	8.8	8.7	9.1	6.6	5.4	5.1
Female:						
At birth	73.6	67.5	65.8	55.6	49.5	35.0
65 years	18.0	15.1	15.7	13.9	12.2	11.4
75 years	12.5	11.5	12.0	9.8	8.6	7.9
80 years	11.5	9.3	10.1	8.0	6.9	6.5

[1] Provisional figures for all classes in 1980 are as follows: At birth, 73.6 years; at age 65, 16.4 years; at age 75, 10.4 years; at age 80, 8.2 years. (Source: National Center for Health Statistics, Monthly Vital Statistics Report, Vol. 29, No. 13, September 17, 1981.)

[2] Black only for 1929-31 and 1900-02.

Source: Life tables published by the U.S. Public Health Service, National Center for Health Statistics, and the U.S. Bureau of the Census. For 1978, see "Final Mortality Statistics, 1978," Monthly Vital Statistics Report, Vol. 29, No. 6 Supplement (2), September 1980.

Table 5-2. Average Years Lived in Interval and Proportion Surviving, for Various Age Intervals, by Sex and Race: 1900 to 1978

Measure, age interval, sex, and race	1978[1]	1968	1954	1939-41	1929-31	1900-02
ALL CLASSES						
Average years lived in interval:						
Under 65 years	60.9	59.8	59.4	55.9	52.9	44.4
65 to 80 years	11.9	11.4	11.2	10.6	10.4	10.1
Proportion surviving:						
Birth to 65 years	.759	.711	.704	.604	.538	.409
65 to 80 years	.538	.476	.460	.379	.350	.331
WHITE						
Male						
Average years lived in interval:						
Under 65 years	60.3	59.1	58.8	55.8	52.9	43.7
65 to 80 years	11.1	10.5	10.6	10.2	10.1	9.9
Proportion surviving:						
Birth to 65 years	.711	.654	.657	.583	.530	.392
65 to 80 years	.433	.381	.395	.341	.325	.313
Female						
Average years lived in interval:						
Under 65 years	62.3	61.6	61.1	58.0	54.9	45.7
65 to 80 years	12.8	12.3	12.0	11.1	10.7	10.3
Proportion surviving:						
Birth to 65 years	.839	.811	.796	.687	.605	.438
65 to 80 years	.641	.578	.530	.420	.381	.350
BLACK AND OTHER RACES[2]						
Male						
Average years lived in interval:						
Under 65 years	57.0	54.3	54.4	47.9	44.4	30.6
65 to 80 years	10.6	9.4	10.0	9.9	9.3	9.1
Proportion surviving:						
Birth to 65 years	.564	.475	.494	.354	.293	.190
65 to 80 years	.392	.316	.381	.345	.281	.254
Female						
Average years lived in interval:						
Under 65 years	60.4	58.0	56.6	49.9	45.7	32.5
65 to 80 years	11.0	10.8	10.9	10.6	9.8	9.4
Proportion surviving:						
Birth to 65 years	.734	.632	.584	.405	.309	.220
65 to 80 years	.525	.467	.478	.421	.351	.305

[1] Provisional figures for all classes for 1980 are as follows: Average years lived, 61.1 and 12.0; proportion surviving, .765 and .541. (Source: See footnote 1 in table 5-1.)

[2] Black only for 1929-31.

Source: Life tables published by the U.S. Public Health Service, National Center for Health Statistics, and the U.S. Bureau of the Census. For 1978, see "Final Mortality Statistics, 1978," Monthly Vital Statistics Report, Vol. 29, No. 6 Supplement (2), September 1980.

Table 5-3. Death Rates for the Population 55 Years and Over, by Age: 1940 to 1980

Measure and year or period	55 to 64 years	65 to 74 years	75 to 84 years	85 years and over	65 years and over	
					Observed	Adjusted[1]
Rates per 1,000 population:						
1980 (prov.)	13.8	29.7	71.8	144.9	51.9	45.0
1979 (prov.)	13.7	29.2	70.1	138.3	51.2	43.9
1978	14.2	30.3	71.9	147.0	52.9	45.5
1968	17.0	37.2	82.9	195.8	61.4	55.3
1954[2]	17.4	37.9	86.0	181.6	58.6	56.0
1940[2]	22.2	48.4	112.0	235.7	72.2	72.2
Percent change:						
1968-80	-18.8	-20.2	-13.4	-26.0	-15.5	-18.6
1954-68	-2.3	-1.8	-3.6	+7.8	+4.8	-1.3
1940-54	-21.6	-21.7	-23.2	-23.0	-18.8	-22.4
Average annual percent change:[3]						
1968-80	-1.7	-1.9	-1.2	-2.5	-1.4	-1.7
1954-68	-0.2	-0.1	-0.3	+0.5	+0.3	-0.1
1940-54	-1.7	-1.7	-1.9	-1.9	-1.5	-1.8

[1] Computed on the basis of the 1940 census population as standard.

[2] Excludes Alaska and Hawaii.

[3] Computed by use of the formula for continuous compounding.

Source: Based on the U.S. Public Health Service, National Center for Health Statistics, various annual volumes of Vital Statistics of the United States; U.S. Public Health Service, National Center for Health Statistics, Monthly Vital Statistics Report, Final Mortality Statistics, 1978, Vol. 29, No. 6, Supplement (2), September 1980; Monthly Vital Statistics Report, Provisional Statistics. Annual Summary for the United States, 1979, Vol. 28, No. 13, November 1980; and Monthly Vital Statistics Report, Provisional Data, Vol. 29, No. 13, September 1981.

Table 5-4. Ratios of Male to Female Death Rates for the Population 55 Years and Over, by Age and Race: 1900-02 to 1980

Race and year	55 to 64 years	65 to 74 years	75 to 84 years	85 years and over	65 years and over
ALL RACES					
1980 (prov.)	1.91	1.92	1.61	1.26	1.46
1978	1.95	1.96	1.60	1.28	1.45
1968	2.08	1.88	1.46	1.18	1.44
1954[1]	1.82	1.57	1.29	1.06	1.30
1940[1]	1.45	1.29	1.17	1.08	1.17
1930[2]	1.25	1.19	1.12	1.07	1.10
1900-02[3]	1.14	1.11	1.08	1.05	1.06
WHITE					
1980 (prov.)	1.95	1.97	1.63	1.27	1.44
1968	2.19	1.94	1.47	1.19	1.45
1954[1]	1.91	1.59	1.29	1.04	1.31
1940[1]	1.50	1.30	1.16	1.07	1.17
1930[2]	1.28	1.20	1.11	1.06	1.10
1900-02[3]	1.12	1.11	1.08	1.05	1.06
BLACK AND OTHER RACES					
1980 (prov.)	1.78	1.57	1.42	1.29	1.49
1968	1.58	1.49	1.36	1.20	1.37
1954[1]	1.33	1.35	1.29	1.30	1.24
1940[1]	1.11	1.22	1.29	1.25	1.18
1930[2]	0.98	1.12	1.29	1.22	1.13
1900-02[4]	1.00	1.08	1.16	1.27	1.06

[1] Excludes Alaska and Hawaii.

[2] Texas excluded from Death Registration States.

[3] For the Original Death Registration States.

[4] For the Original Death Registration States; Black population only

Source: Based on U.S. Bureau of the Census, United States Life Tables, 1930, 1936; U.S. Public Health Service, National Center for Health Statistics, annual volumes of Vital Statistics of the United States, 1940, 1954, and 1968; and U.S. Public Health Service, National Center for Health Statistics, Monthly Vital Statistics Report, Final Mortality Statistics, 1978, Vol. 29, No. 6, Supplement (2), September 1980, and Monthly Vital Statistics Report, Provisional Data, Vol. 29, No. 13, September 1981.

Table 5-5. Ratios of Black and Other Races to White Death Rates for the Population 55 Years and Over, by Age and Sex: 1900-02 to 1980

Sex and year	55 to 64 years	65 to 74 years	75 to 84 years	85 years and over	65 years and over
BOTH SEXES					
1980 (prov.)	1.61	1.23	1.15	0.57	1.00
1978	1.55	1.22	1.06	0.60	0.97
1968	1.64	1.32	0.94	0.70	1.00
1954[1]	1.70	1.33	0.82	0.53	0.98
1940[1]	1.79	1.08	0.85	0.73	1.01
1930[2]	1.79	1.26	0.92	0.89	1.15
1900-02[3]	1.56	1.23	0.98	0.82	1.13
MALE					
1980 (prov.)	1.57	1.11	1.05	0.57	1.02
1968	1.45	1.17	0.89	0.69	0.96
1954[1]	1.49	1.08	0.80	0.56	0.95
1940[1]	1.47	1.16	0.89	0.79	1.02
1930[2]	1.58	1.22	0.99	0.96	1.16
1900-02[3]	1.48	1.21	1.02	0.93	1.13
FEMALE					
1980 (prov.)	1.72	1.40	1.20	0.56	0.97
1968	2.01	1.52	0.97	0.69	1.02
1954[1]	2.13	1.27	0.81	0.60	1.00
1940[1]	1.97	1.26	0.80	0.68	1.00
1930[2]	2.08	1.30	0.85	0.83	1.14
1900-02[3]	1.65	1.24	0.95	0.76	1.13

[1] Excludes Alaska and Hawaii.

[2] Texas excluded from Death Registration States.

[3] For the original Death Registration States; Black population only.

Source: Based on U.S. Bureau of the Census, United States Life Tables, 1930. 1936; U.S. Public Health Service, National Center for Health Statistics, annual volume of Vital Statistics of the United States, 1940, 1954, and 1968; and U.S. Public Health Service, National Center for Health Statistics, Monthly Vital Statistics Report, Final Mortality Statistics, 1978, Vol. 29, No. 6, Supplement (2), September 1980, and Monthly Vital Statistics Report, Provisional Data, Vol. 29, No. 13, September 1981.

Table 5-6. Death Rates for the Ten Leading Causes of Death for the Population 55 Years and Over, by Age: 1978

(Rates per 100,000 population)

Cause of death by rank[1]	55 to 64 years	65 to 74 years	75 to 84 years	85 years and over	65 years and over
All causes	1,616.7	3,027.2	7,187.8	14,700.7	5,293.5
1. Diseases of the heart (390-398, 402, 404, 410-429)	521.8	1,230.8	3,191.6	7,084.3	2,331.1
2. Malignant neoplasms (140-209)	441.8	800.7	1,293.8	1,450.5	1,002.0
3. Cerebrovascular diseases (430-438)	74.1	243.6	910.2	2,281.6	622.0
4. Influenza and pneumonia (470-474, 480-486)	24.0	65.8	262.1	839.8	193.2
5. Arterioclerosis (440)	4.8	24.3	143.9	638.4	115.0
6. Diabetes mellitus (250)	26.9	64.5	145.5	211.9	101.3
7. Accidents (E800-E949)	46.4	60.7	129.4	276.8	100.3
Motor vehicle (E810-E823)	18.8	21.5	31.2	24.0	24.5
All other (E800-E807, E825-E949)	27.7	39.2	98.3	252.8	75.8
8. Bronchitus, emphysema, and asthma (490-493)	19.7	51.2	90.9	89.5	66.1
9. Cirrhosis of liver (571)	43.5	41.6	30.8	18.0	36.3
10. Nephritis and nephrosis (580-584)	6.6	15.1	36.4	62.6	25.6
All other causes	206.7	629.0	953.2	1,747.2	700.6

[1] Based on National Center for Health Statistics, Eighth Revision International Classification of Diseases, Adapted for Use in the United States, PHS Pub. No. 1693, Public Health Service, Washington, D.C., 1967. The ten leading causes of death were defined on the basis of rates for the population 65 years and over. Figures in parentheses represents codes in the International Classification.

Source: Data on deaths from U.S. Public Health Service, National Center for Health Statistics, Monthly Vital Statistics Report, Advance Report, Final Mortality Statistics, 1978, Vol. 29, No. 6, Supplement (2), September 1980; population data from U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 870, January 1980.

Table 5-7. Ratios of Male to Female Death Rates for the Ten Leading Causes of Death for the Population 65 Years and Over, by Age: 1978

Cause of death by rank[1]	65 years and over	65 to 74 years	75 to 84 years	85 years and over
All causes	1.450	1.958	1.601	1.275
1. Diseases of the heart	1.405	2.141	1.525	1.197
2. Malignant neoplasms	1.788	1.829	1.929	1.876
3. Cerebrovascular diseases	0.973	1.394	1.137	0.976
4. Influenza and pneumonia	1.487	2.263	1.890	1.521
5. Arteriosclerosis	0.923	1.609	1.218	1.035
6. Diabetes mellitus	0.875	0.998	0.915	0.917
7. Accidents	1.616	2.143	1.740	1.481
Motor vehicle	2.361	2.139	2.513	4.217
All other	1.434	2.145	1.551	1.336
8. Bronchitus, emphysema, and asthma	3.840	3.393	4.766	3.795
9. Cirrhosis of liver	2.579	2.589	2.300	2.339
10. Nephritis and nephrosis	1.685	1.653	2.019	1.967
All other causes	1.697	2.096	1.925	1.508

[1] Based on National Center for Health Statistics, Eighth Revision International Classification of Diseases, Adapted for Use in the United States, PHS Pub. No. 1693, Public Health Service, Washington, D.C., 1967. The ten leading causes of death were defined on the basis of rates for the population 65 years and over for both sexes combined.

Source: Based on U.S. Public Health Service, National Center for Health Statistics, Monthly Vital Statistics Report, Advance Report, Final Mortality Statistics, 1978, Vol. 29, No. 6, Supplement (2), September 1980.

Table 5-8. Ratios of Black and Other Races to White Death Rates for the Ten Leading Causes of Death for the Population 65 Years and Over, by Age: 1978

Cause of death by rank[1]	65 years and over	65 to 74 years	75 to 84 years	85 years and over
All causes	0.972	1.223	1.057	0.603
1. Diseases of the heart	0.862	1.100	0.954	0.547
2. Malignant neoplasms	1.021	1.120	1.061	0.694
3. Cerebrovascular diseases	1.096	1.836	1.193	0.599
4. Influenza and pneumonia	0.842	1.413	0.977	0.490
5. Arteriosclerosis	0.720	1.345	0.931	0.467
6. Diabetes mellitus	1.528	1.993	1.572	0.783
7. Accidents	1.050	1.423	1.092	0.555
Motor vehicle	1.083	1.160	1.133	0.685
All other	1.039	1.573	1.078	0.540
8. Bronchitis, emphysema, and asthma	0.457	0.481	0.470	0.411
9. Cirrhosis of liver	0.856	0.912	0.706	0.523
10. Nephritis and nephrosis	2.522	3.234	2.737	1.442
All other causes	1.163	1.345	1.250	0.844

[1] Based on National Center for Health Statistics, Eighth Revision International Classification of Diseases, Adapted for Use in the United States, PHS Pub. No. 1693, Public Health Service, Washington, D.C., 1967. The ten leading causes were defined on the basis of rates for the population 65 years and over for all races combined.

Source: Based on U.S. Public Health Service, National Center for Health Statistics, Monthly Vital Statistics Report, Advance Report, Final Mortality Statistics, 1978, Vol. 29, No. 6, Supplement (2), September, 1980.

Table 5-9. Death Rates for the Ten Leading Causes of Death for Males and Females 55 Years and Over, by Age, 1978, and Percent Change, 1968-78 and 1954-68

[Rates per 100,000 population]

Cause of death and sex[1]	55 to 64 years			65 to 74 years			75 to 84 years			85 years and over		
	1978	Percent change		1978	Percent change		1978	Percent change		1978	Percent change	
		1968-78	1954-68		1968-78	1954-68		1968-78	1954-68		1968-78	1954-68
All causes	1,417.0	-17.8	-1.9	3,028.2	-21.3	-1.6	7,189.4	-11.0	-3.6	14,705.6	-25.0	+7.8
Male	1,907.2	-19.5	+4.0	4,187.4	-19.2	+8.0	9,389.7	-5.[illegible]	+4.2	17,267.0	-15.3	+16.0
Female	976.6	-14.3	-8.9	2,138.2	-23.2	-10.0	5,864.6	-14.[illegible]	-8.5	13,544.7	-29.3	+3.9
Diseases of heart:												
Male	791.6	-24.4	+2.6	1,762.2	-24.0	+6.9	4,065.4	-9.7	+5.6	7,993.2	-15.5	+21.4
Female	279.8	-25.8	-12.6	823.3	-30.5	-9.6	2,666.3	-16.4	-5.8	6,674.8	-27.5	+9.4
Malignant neoplasms:												
Male	522.1	+3.7	+15.0	1,076.9	+5.1	+18.9	1,849.7	+25.8	+10.8	2,137.2	+17.7	+14.6
Female	369.8	+8.4	-3.4	588.8	+2.5	-6.2	958.9	+12.7	-10.6	1,139.4	-10.5	-4.1
Cerebrovascular diseases:												
Male	85.3	-41.3	-22.4	290.1	-41.5	-12.3	984.8	-28.2	-6.4	2,244.6	-33.4	+24.4
Female	64.1	-37.5	-36.1	207.9	-43.0	-23.8	865.6	-29.2	-11.7	2,298.8	-38.9	+13.8
Influenza and pneumonia:												
Male	33.1	-43.8	+51.8	96.2	-38.5	+64.9	371.2	-11.1	+66.7	1,099.0	-14.8	+77.7
Female	15.8	-42.5	+57.6	42.5	-41.1	+35.4	196.4	-23.3	+38.3	722.7	-34.2	+57.6
Arteriosclerosis:												
Male	6.5	-27.8	-31.0	30.9	-40.7	-28.3	161.9	-31.5	-33.6	653.8	-39.4	-16.4
Female	3.3	-34.0	-35.9	19.2	-43.7	-32.5	133.1	-33.5	-31.6	631.8	-45.2	-21.0
Diabetes mellitus:												
Male	27.2	-28.4	+27.6	64.4	-28.9	+26.1	137.6	-14.3	+26.6	199.4	-15.8	+76.5
Female	26.6	-34.0	-15.1	64.5	-39.5	-8.7	150.4	-24.5	+18.0	217.6	-19.9	+59.2
Motor vehicle accidents:												
Male	27.0	-35.7	+8.6	30.8	-40.0	-0.6	50.0	-31.4	-3.2	50.6	-27.2	+4.2
Female	11.4	-32.9	+14.3	14.4	-40.2	+19.6	19.9	-27.9	+13.7	12.0	-44.7	-11.1
All other accidents:												
Male	41.7	-26.5	+0.4	56.2	-29.8	-9.5	126.4	-16.6	-23.9	306.1	-29.0	-25.5
Female	15.1	-18.4	+5.2	26.2	-31.8	-26.3	81.5	-36.5	-42.7	229.1	-54.4	-41.3
Bronchitis, emphysema, and asthma:												
Male	27.3	-60.6	(NA)	86.6	-53.7	(NA)	179.2	-34.1	(NA)	181.4	-35.2	(NA)
Female	12.9	-19.4	(NA)	24.1	-8.4	(NA)	37.6	-8.1	(NA)	47.8	-39.1	(NA)
Cirrhosis of liver:												
Male	61.6	-8.2	+57.7	53.7	+1.6	+18.6	47.6	+11.0	-6.7	29.7	+2.4	-34.8
Female	27.4	-2.5	+68.5	24.6	+0.8	+13.8	20.7	+8.4	-25.3	12.7	-33.2	-39.8
Nephritis and nephrosis:												
Male	7.3	-33.6	-56.4	19.5	-8.0	-60.6	53.1	+31.4	-68.0	94.8	+6.2	-65.1
Female	5.9	-24.4	-61.9	11.8	-5.6	-69.2	26.3	+5.6	-73.6	48.2	-26.6	-69.9
All other causes:												
Male	276.4	-14.4	(NA)	609.9	-5.3	(NA)	1,361.9	+19.0	(NA)	2,277.3	+1.6	(NA)
Female	144.5	-8.9	(NA)	290.9	-9.2	(NA)	708.0	+5.6	(NA)	1,510.0	-12.0	(NA)

NA Not available.

[1] Ten leading causes of death are defined on the basis of 1978 rates for the population 65 years and over of both sexes combined. Data for 1978 and 1968 are based on the Eighth Revision of the International Classification of Diseases, Injuries, and Causes of Death; data for 1954 are based on the Sixth Revision.

Source: U.S. Public Health Service, National Center for Health Statistics, Vital Statistics in the United States, volumes for 1954 and 1968, and National Center for Health Statistics, Monthly Vital Statistics Report, Advance Report, Final Mortality Statistics, 1978, Vol. 29, No. 6, Supplement (2), September 1980.

Table 5-10. Gain in Expectation of Life at Birth and at Age 65, in Years, Due to Elimination of Various Causes of Death, by Sex and Race: 1978 and 1969-71

(Based on the Eighth Revision of the International Classification of Diseases, Injuries, and Causes of Death)

Cause of death and year	Total		White male		White female		Black male[1]		Black female[1]	
	At birth	At age 65	At birth	At age 65	At birth	At age 65	At birth	At age 65	At birth	At age 65
1978										
Major cardiovascular diseases	13.9	14.3	10.6	10.1	16.4	17.4	10.6	11.2	20.3	22.1
Diseases of the heart	7.0	6.6	6.5	5.5	6.9	7.0	6.1	5.8	8.8	9.0
Cerebrovascular diseases	1.1	1.2	0.7	0.8	1.4	1.4	1.2	1.2	2.2	2.2
Arteriosclerosis	0.2	0.2	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.3
Malignant neoplasms[2]	3.1	1.9	2.8	1.9	3.1	1.7	3.4	2.6	3.3	2.0
Influenza and pneumonia	0.4	0.3	0.3	0.3	0.4	0.3	0.5	0.4	0.5	0.3
Diabetes mellitus	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.6	0.4
Motor vehicle accidents	0.6	-	0.9	0.1	0.4	-	0.7	0.1	0.3	-
All accidents excluding motor vehicle	0.6	0.1	0.7	0.1	0.3	0.1	1.0	0.2	0.5	0.2
Bronchitis, emphysema, and asthma	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	-
Cirrhosis of liver	0.3	0.1	0.3	0.1	0.2	0.1	0.5	0.1	0.3	-
Nephritis and nephrosis	0.1	-	0.1	-	0.1	-	0.1	0.1	0.2	0.1
Infective and parasitic diseases	0.2	0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.4	0.2
Tuberculosis, all forms	-	-	-	-	-	-	0.1	-	-	-
1969-71										
Major cardiovascular diseases[3]	11.8	11.4	10.5	9.5	12.0	12.2	10.4	10.4	15.3	15.1
Diseases of the heart	5.9	5.1	6.1	4.9	5.2	5.0	5.3	4.8	6.3	5.8
Cerebrovascular diseases	1.2	1.2	0.9	0.9	1.4	1.3	1.4	1.3	2.2	1.9
Malignant neoplasms[2]	2.5	1.4	2.3	1.4	2.6	1.2	2.3	1.7	2.4	1.2
Influenza and pneumonia	0.5	0.2	0.4	0.2	0.4	0.2	0.8	0.3	0.7	0.3
Diabetes mellitus	0.2	0.2	0.2	0.1	0.3	0.2	0.2	0.2	0.6	0.4
Motor vehicle accidents	0.7	0.1	0.9	0.1	0.4	0.1	1.0	0.1	0.4	-
All accidents excluding motor vehicle	0.6	0.1	0.8	0.1	0.4	0.1	1.2	0.2	0.5	0.1
Infective and parasitic diseases	0.2	0.1	0.1	-	0.1	-	0.4	0.1	0.3	0.1
Tuberculosis, all forms	-	-	-	-	-	-	0.1	0.1	0.1	-

- Less than 0.05.

[1] Black and other races for 1969-71.
[2] Malignant neoplasms including lymphatic and hematopoietic tissues.
[3] Major cardiovascular-renal diseases for 1969-71.

Source: Prithwis Das Gupta, "Cause-of-Death Analysis of the 1978 U.S. Mortality Data by Age, Sex, and Race," U. S. Bureau of the Census, 1981 (unpublished manuscript), and U.S. Public Health Service, National Center for Health Statistics, "U.S. Life Tables by Causes of Death: 1969-71," by T.N.E. Greville, U.S. Decennial Life Tables for 1969-71, Vol. 1, No. 5, 1975.

Table 5-11. Probability at Birth and at Age 65 of Eventually Dying From Various Causes, by Sex and Race: 1978 and 1969-71

(Based on the Eighth Revision of the International Classification of Diseases, Injuries, and Causes of Death)

Cause of death and year	Total		White male		White female		Black male[1]		Black female[1]	
	At birth	At age 65	At birth	At age 65	At birth	At age 65	At birth	At age 65	At birth	At age 65
1978										
Major cardiovascular diseases	.548	.616	.521	.579	.592	.656	.430	.530	.547	.630
Diseases of the heart	.406	.447	.410	.441	.419	.460	.319	.381	.377	.428
Cerebrovascular diseases	.104	.124	.078	.097	.131	.146	.087	.116	.134	.158
Arteriosclerosis	.019	.025	.014	.019	.026	.031	.010	.012	.017	.023
Malignant neoplasms[2]	.193	.175	.204	.199	.184	.152	.206	.221	.170	.145
Influenza and pneumonia	.034	.040	.032	.039	.037	.040	.033	.038	.027	.028
Diabetes mellitus	.018	.019	.013	.014	.021	.021	.016	.018	.034	.036
Motor vehicle accidents	.017	.004	.024	.005	.010	.003	.023	.006	.007	.002
All accidents excluding motor vehicle	.022	.015	.026	.014	.018	.015	.035	.016	.018	.013
Bronchitis, emphysema, and asthma	.011	.012	.016	.019	.007	.006	.008	.008	.004	.003
Cirrhosis of liver	.013	.006	.016	.008	.003	.004	.022	.006	.012	.003
Nephritis and nephrosis	.005	.005	.004	.005	.004	.004	.009	.011	.011	.011
Infective and parasitic diseases	.009	.007	.008	.007	.008	.007	.016	.014	.015	.013
Tuberculosis, all forms	.001	.001	.001	.001	.001	.001	.005	.004	.002	.002
1969-71										
Major cardiovascular diseases[3]	.588	.672	.565	.640	.632	.706	.472	.606	.593	.694
Diseases of the heart	.412	.460	.422	.460	.421	.468	.317	.401	.372	.436
Cerebrovascular diseases	.122	.149	.095	.122	.151	.171	.106	.146	.160	.190
Malignant neoplasms[2]	.163	.145	.169	.164	.159	.128	.154	.168	.135	.112
Influenza and pneumonia	.034	.037	.032	.037	.035	.037	.040	.041	.035	.034
Motor vehicle accidents	.020	.006	.028	.007	.012	.004	.032	.008	.011	.003
All accidents excluding motor vehicle	.026	.018	.033	.016	.021	.019	.043	.018	.022	.017
Infective and parasitic diseases	.007	.005	.007	.006	.006	.004	.017	.013	.012	.008
Tuberculosis, all forms	.002	.002	.003	.003	.001	.001	.008	.007	.004	.003

[1] Black and other races for 1969-71.
[2] Malignant neoplasms including lymphatic and hematopoietic tissues.
[3] Major cardiovascular-renal diseases for 1969-71.

Source: Prithwis Das Gupta, "Cause-of-Death Analysis of the 1978 U.S. Mortality Data by Age, Sex, and Race," U.S. Bureau of the Census, 1981 (unpublished manuscript), and U.S. Public Health Service, National Center for Health Statistics, "U.S. Life Tables by Causes of Death: 1969-71," by T.N.E. Greville, U.S. Decennial Life Tables for 1969-71, Vol. 1, No. 5, 1975.

Table 5-12. Variation in Life Expectation at Birth and at Age 65, by Sex and Race, for States: 1969-71 and 1959-61

Area, age, and period	Total	White			Black[1]			Difference[2]	
		Male	Female	Difference[2]	Male	Female	Difference[2]	Male	Female
1969-71									
At birth:									
High State	73.6	[3]69.6	[3]77.3	7.7	[4]63.7	[4]72.3	8.6	5.9	5.0
United States	70.8	67.9	75.5	7.6	61.0	69.1	8.1	6.9	6.4
Low State	65.7	[3]65.8	[3]73.7	7.9	[4]58.3	[4]67.0	8.7	7.5	6.7
Mean deviation[5]	1.15	0.80	0.58	-0.22	1.09	0.93	-0.16	-0.29	-0.35
At age 65:									
High State	16.2	[3]14.2	[3]18.2	4.0	[4]14.3	[4]17.5	3.2	-0.1	0.7
United States	15.0	13.0	16.9	3.9	12.9	16.0	3.1	0.1	0.9
Low State	14.4	[3]12.2	[3]16.1	3.9	[4]11.7	[4]15.1	3.4	0.5	1.0
Mean deviation[5]	0.46	0.64	0.65	0.01	0.63	0.71	0.08	0.01	-0.06
1959-61									
At birth:									
High State	72.0	[3]69.2	[3]75.7	6.5	[6]64.3	[6]67.9	3.6	4.9	7.8
United States	69.9	67.6	74.2	6.6	61.5	66.5	5.0	6.1	7.7
Low State	66.4	[3]64.6	[3]72.7	8.1	[6]57.3	[6]63.4	6.1	7.3	9.3
Mean deviation[7]	1.06	0.68	0.62	-0.06	1.13	0.90	-0.23	-0.45	-0.28
At age 65:									
High State	15.7	[3]14.3	[3]17.4	3.1	[6]13.7	[6]16.3	2.6	0.6	1.1
United States	14.6	13.0	15.9	2.9	12.8	15.1	2.3	0.2	0.8
Low State	13.6	[3]12.1	[3]15.0	2.9	[6]11.7	[6]13.9	2.2	0.4	1.1
Mean deviation[7]	0.41	0.44	0.47	0.03	0.47	0.53	0.06	-0.03	-0.06

[1] Data actually relate to Blacks and other races but Blacks represented over 90 percent of the total Black-and-other-races population in the United States.

[2] Excess of female over male value or White over Black value. A minus sign denotes an excess of male over female or an excess of Black over White.

[3] Forty-eight States, excluding Alaska, Hawaii, and District of Columbia.

[4] Twenty-three States and District of Columbia, excluding California, Hawaii, and Oklahoma.

[5] Mean deviation around U.S. unweighted average; for "Black," 23 States and District of Columbia, excluding California, Hawaii, and Oklahoma.

[6] Twenty-one States and District of Columbia, excluding California, Hawaii, and Oklahoma.

[7] Mean deviation around U.S. unweighted average; for "Black," 21 States and District of Columbia, excluding California, Hawaii, and Oklahoma.

Source: U.S. Public Health Service, National Center for Health Statistics, State Life Tables, 1959-61, 1966, and 1969-71, 1975.

Table 5-13. Life Expectation at Birth and at Age 65, by Sex, for Regions, Divisions, and States: 1969-71

Region, division, and State	Both sexes		Male		Female		Excess of female over male	
	At birth	At age 65	At birth	At age 65	At birth	At age 65	At birth	At age 65
United States	70.8	15.0	67.0	13.0	74.6	16.8	7.6	3.8
Regions:								
Northeastern States	70.9	14.7	67.3	12.7	74.5	16.4	7.2	3.7
North Central States	71.2	15.0	67.6	13.0	75.0	16.8	7.4	3.8
The South	69.8	15.1	65.9	13.1	74.1	16.9	8.2	3.8
The West	71.8	15.5	68.1	13.4	75.5	17.4	7.4	4.0
Northeast:								
New England	71.9	15.1	68.2	12.9	75.5	16.9	7.3	4.0
Middle Atlantic	70.6	14.6	67.1	12.7	74.2	16.2	7.1	3.5
North Central:								
East North Central	70.8	14.8	67.2	12.8	74.6	16.5	7.4	3.7
West North Central	72.1	15.5	68.4	13.4	76.1	17.4	7.7	4.0
South:								
South Atlantic	69.5	15.1	65.5	13.1	73.8	17.0	8.3	3.9
East South Central	69.5	14.8	65.5	12.8	73.7	16.6	8.2	3.8
West South Central	70.5	15.2	66.7	13.2	74.7	17.1	8.0	3.9
West:								
Mountain	71.2	15.5	67.5	13.6	75.4	17.5	7.9	3.9
Pacific	71.8	15.5	68.3	13.4	75.5	17.4	7.2	4.0
New England:								
Maine	70.9	14.7	67.2	12.6	74.9	16.6	7.7	4.0
New Hampshire	71.2	14.7	67.5	12.6	75.2	16.7	7.7	4.1
Vermont	71.6	14.8	67.8	12.6	75.8	16.8	8.0	4.2
Massachusetts	71.8	15.1	68.1	12.8	75.4	16.9	7.3	4.1
Rhode Island	71.9	15.0	68.3	12.9	75.5	16.7	7.2	3.8
Connecticut	72.5	15.3	69.0	13.2	75.9	17.1	6.9	3.9
Middle Atlantic:								
New York	70.5	14.7	67.0	12.8	74.2	76.3	7.2	3.5
New Jersey	70.9	14.6	67.5	12.7	74.4	16.3	6.9	3.6
Pennsylvania	70.4	14.4	66.9	12.5	74.1	16.0	7.2	3.5
East North Central:								
Ohio	70.8	14.6	67.2	12.6	74.5	16.4	7.3	3.8
Indiana	70.9	14.7	67.2	12.7	74.7	16.6	7.5	3.9
Illinois	70.1	14.6	66.5	12.7	74.0	16.4	7.5	3.7
Michigan	70.6	14.7	67.1	12.8	74.5	16.6	7.4	3.8
Wisconsin	72.5	15.3	69.2	13.4	76.0	17.1	6.8	3.7
West North Central:								
Minnesota	73.0	15.7	69.4	13.8	76.8	17.6	7.4	3.8
Iowa	72.6	15.6	68.8	13.4	76.5	17.6	7.7	4.2
Missouri	70.7	15.0	66.9	12.9	74.7	16.8	7.8	3.9
North Dakota	72.8	15.8	69.2	13.8	77.0	17.9	7.8	4.1
South Dakota	72.1	15.8	68.5	13.7	76.2	18.0	7.7	4.3
Nebraska	72.6	15.9	68.9	13.7	76.6	17.9	7.7	4.2
Kansas	72.6	15.8	68.8	13.7	76.5	17.7	7.7	4.0
South Atlantic:								
Delaware	70.1	14.4	66.3	12.1	74.1	16.4	7.8	4.3
Maryland	70.2	14.5	66.5	12.4	74.2	16.3	7.7	3.9
District of Columbia	65.7	14.6	60.9	12.2	70.5	16.4	9.6	4.2
Virginia	70.1	14.7	66.3	12.6	74.2	16.6	7.9	4.0
West Virginia	69.5	14.5	65.6	12.6	73.7	16.3	8.1	3.7
North Carolina	69.2	14.8	64.9	12.7	73.8	16.7	8.9	4.0
South Carolina	68.0	14.5	63.8	12.3	72.3	16.3	8.5	4.0
Georgia	68.5	14.7	64.3	12.4	73.0	16.6	8.7	4.2
Florida	70.7	16.1	66.6	14.1	75.0	18.0	8.4	3.9
East South Central:								
Kentucky	70.1	14.8	66.2	12.9	74.3	16.6	8.1	3.7
Tennessee	70.1	14.9	66.2	12.9	74.3	16.7	8.1	3.8
Alabama	69.1	14.8	64.9	12.7	73.4	16.5	8.5	3.8
Mississippi	68.1	14.6	64.1	12.8	72.4	16.4	8.3	3.6
West South Central:								
Arkansas	70.7	15.4	66.7	13.5	75.0	17.3	8.3	3.8
Louisiana	68.8	14.4	64.9	12.5	72.9	16.2	8.0	3.7
Oklahoma	71.4	15.5	67.4	13.3	75.7	17.5	8.3	4.2
Texas	70.9	15.4	67.1	13.3	75.0	17.3	7.9	4.0
Mountain:								
Montana	70.6	15.3	66.7	13.3	75.1	17.5	8.4	4.2
Idaho	71.9	15.7	68.2	13.8	76.1	17.6	7.9	3.8
Wyoming	70.3	15.3	66.2	13.2	75.2	17.6	9.0	4.4
Colorado	72.1	15.7	68.4	13.7	75.9	17.5	7.5	3.8
New Mexico	70.3	15.5	66.5	13.8	74.5	17.2	8.0	3.4
Arizona	70.6	15.5	66.6	13.5	75.0	17.7	8.4	4.2
Utah	72.9	15.7	69.5	13.9	76.6	17.4	7.1	3.5
Nevada	69.0	14.4	65.6	12.6	73.3	16.4	7.7	3.8
Pacific:								
Washington	71.7	15.3	68.1	13.1	75.8	17.3	7.7	4.2
Oregon	72.1	15.6	68.4	13.5	76.2	17.6	7.8	4.1
California	71.7	15.5	68.2	13.4	75.4	17.4	7.2	4.0
Alaska	69.3	14.7	66.1	13.1	74.0	17.0	7.9	3.9
Hawaii	73.6	16.2	71.0	14.8	76.8	17.9	5.8	3.1

Source: U.S. Public Health Service, National Center for Health Statistics, State Life Tables: 1969-71, 1975; figures for divisions and regions were derived by the Census Bureau by weighting the official figures for States.

Table 5-14. Life Expectation at Birth and at Age 65, by Race, for Regions, Divisions, and States: 1969-71

Region, division, and State	White		Black and other races		Excess of White over Black and other races[1]	
	At birth	At age 65	At birth	At age 65	At birth	At age 65
United States	71.6	15.1	65.0	14.5	6.6	0.6
Regions:						
Northeastern States	71.6	14.7	64.9	14.5	6.7	0.2
North Central States	71.8	15.1	64.5	14.2	7.3	0.9
The South	71.3	15.3	64.0	14.3	7.3	1.0
The West	71.7	15.4	70.7	16.4	1.0	-1.0
Northeast:						
New England	72.1	15.0	67.5	15.8	4.6	-0.8
Middle Atlantic	71.4	14.6	64.7	14.4	6.7	0.2
North Central:						
East North Central	71.5	14.8	64.6	14.2	6.9	0.6
West North Central	72.5	15.5	63.9	14.3	8.6	1.2
South:						
South Atlantic	71.3	15.4	63.3	14.2	8.0	1.2
East South Central	70.9	15.0	64.1	14.1	6.8	0.9
West South Central	71.6	15.4	65.4	14.7	6.2	0.7
West:						
Mountain	71.6	15.5	(S)	(S)	(S)	(S)
Pacific	70.3	15.3	70.7	16.4	-0.4	-1.1
New England:						
Maine	70.9	14.7	(S)	(S)	(S)	(S)
New Hampshire	71.2	14.7	(S)	(S)	(S)	(S)
Vermont	71.6	14.8	(S)	(S)	(S)	(S)
Massachusetts	72.0	15.1	67.7	15.8	4.3	-0.7
Rhode Island	72.1	14.9	(S)	(S)	(S)	(S)
Connecticut	72.9	15.3	67.2	15.9	5.7	-0.6
Middle Atlantic:						
New York	71.5	14.7	65.1	14.8	6.4	-0.1
New Jersey	71.8	14.7	64.4	14.2	7.4	0.5
Pennsylvania	71.2	14.4	63.8	13.8	7.4	0.6
East North Central:						
Ohio	71.4	14.7	65.3	14.1	6.1	0.6
Indiana	71.3	14.8	65.4	14.2	5.9	0.6
Illinois	71.2	14.7	63.7	14.0	7.5	0.7
Michigan	71.5	14.8	65.0	14.6	6.5	0.2
Wisconsin	72.6	15.3	(S)	(S)	(S)	(S)
West North Central:						
Minnesota	73.0	15.7	(S)	(S)	(S)	(S)
Iowa	72.6	15.6	(S)	(S)	(S)	(S)
Missouri	71.6	15.1	63.9	14.3	7.7	0.8
North Dakota	73.1	15.8	(S)	(S)	(S)	(S)
South Dakota	73.0	15.9	(S)	(S)	(S)	(S)
Nebraska	72.9	15.9	(S)	(S)	(S)	(S)
Kansas	72.9	15.8	(S)	(S)	(S)	(S)
South Atlantic:						
Delaware	71.4	14.6	(S)	(S)	(S)	(S)
Maryland	71.6	14.7	64.6	13.8	7.0	0.9
District of Columbia	70.6	15.5	63.6	13.6	7.0	1.9
Virginia	71.6	15.0	64.1	13.6	7.5	1.4
West Virginia	69.8	14.6	(S)	(S)	(S)	(S)
North Carolina	71.1	15.1	63.2	14.0	7.9	1.1
South Carolina	70.3	14.6	62.6	14.6	7.7	0.0
Georgia	70.6	14.9	62.9	14.5	7.7	0.4
Florida	72.2	16.2	62.9	14.5	9.3	1.7
East South Central:						
Kentucky	70.7	14.9	63.6	13.4	7.1	1.5
Tennessee	71.2	15.7	64.5	13.9	6.7	1.8
Alabama	70.9	15.0	63.9	14.2	7.0	0.8
Mississippi	70.5	14.9	64.0	14.3	6.5	0.6
West South Central:						
Arkansas	71.7	15.5	65.9	15.0	5.8	0.5
Louisiana	70.7	14.7	64.4	13.9	6.3	0.8
Oklahoma	71.8	15.4	67.8	16.0	4.0	-0.6
Texas	71.7	15.5	65.5	14.9	6.2	0.6
Mountain:						
Montana	71.0	15.4	(S)	(S)	(S)	(S)
Idaho	72.0	15.7	(S)	(S)	(S)	(S)
Wyoming	70.5	15.3	(S)	(S)	(S)	(S)
Colorado	72.2	15.7	(S)	(S)	(S)	(S)
New Mexico	71.0	15.4	(S)	(S)	(S)	(S)
Arizona	71.3	15.5	(S)	(S)	(S)	(S)
Utah	73.0	15.6	(S)	(S)	(S)	(S)
Nevada	69.4	14.3	(S)	(S)	(S)	(S)
Pacific:						
Washington	71.9	15.2	(S)	(S)	(S)	(S)
Oregon	72.2	15.5	(S)	(S)	(S)	(S)
California	71.9	15.5	70.1	16.4	1.8	-0.9
Alaska	(S)	(S)	(S)	(S)	(S)	(S)
Hawaii	(S)	(S)	73.7	16.5	(S)	(S)

S Not computed because fewer than 1,600 male or female deaths for the specified race were registered in the 3-year period 1969-71.

[1] A minus sign denotes an excess of Black and other races over White.

Source: U.S. Public Health Service, National Center for Health Statistics, State Life Tables, 1969-71, 1975; figures for divisions and regions were derived by the Census Bureau by weighting the official figures for States.

Table 5-15. Death Rates for the Population 60 Years and Over of Various Countries, by Sex and Age: Various Years From 1976 to 1978

(Deaths per 1,000 population in specified groups)

Country and year	Male						Female					
	60-64 years	65-69 years	70-74 years	75-79 years	80-84 years	85 years and over	60-64 years	65-69 years	70-74 years	75-79 years	80-84 years	85 years and over
Austria, 1977	22.9	37.3	61.6	98.0	146.2	232.0	11.4	19.0	34.1	62.6	112.0	206.3
Belgium, 1976	25.8	42.1	64.0	98.9	150.0	246.5	11.2	19.4	34.8	63.6	108.8	208.1
Czechoslovakia, 1977	28.2	44.9	71.8	107.5	163.9	269.4	13.7	22.7	40.7	72.7	127.0	226.1
Denmark, 1978	20.9	33.9	53.2	79.9	120.3	203.6	10.9	16.8	27.6	47.9	81.6	170.0
Finland, 1978	27.7	41.6	64.4	95.1	145.4	218.8	9.9	17.2	31.7	57.9	95.7	186.9
France, 1977	19.3	32.7	51.3	84.4	133.6	237.0	7.7	13.6	24.1	45.7	85.6	189.3
Germany, East, 1978	24.7	39.5	65.4	104.2	160.2	273.7	13.3	21.3	39.3	72.1	127.3	234.9
Germany, West, 1978	23.4	37.2	62.2	97.0	147.0	232.5	10.9	17.9	32.6	59.3	106.0	199.3
Hungary, 1978	29.4	43.8	71.0	112.5	169.1	265.0	15.2	24.8	43.4	77.6	133.3	233.4
Italy, 1977	21.0	33.9	53.3	85.5	135.2	230.2	9.5	16.6	29.4	55.5	104.4	199.4
Netherlands, 1978	20.6	33.8	53.7	81.3	121.1	206.1	8.6	14.3	25.7	46.1	82.9	169.7
Norway, 1978	18.7	29.7	49.0	76.9	117.8	208.4	8.5	14.6	25.5	49.3	84.4	176.0
Sweden, 1978	17.7	29.3	47.7	78.2	122.7	219.2	8.2	14.3	25.8	47.9	85.5	172.7
Switzerland, 1978	18.6	30.4	48.2	76.2	122.7	208.8	8.6	14.2	24.6	44.0	83.7	171.2
England and Wales, 1977	23.9	38.9	62.3	96.5	142.4	232.2	12.2	19.2	32.1	54.9	97.1	188.6
Australia, 1977	23.0	36.5	55.7	85.8	127.1	216.4	11.4	17.4	28.7	50.7	86.2	177.1
New Zealand, 1978	24.0	35.5	59.2	84.3	117.4	234.0	12.0	18.7	30.8	51.6	82.4	175.9
Japan, 1978	15.4	26.2	44.9	76.0	121.2	207.6	8.3	14.3	26.6	49.6	90.1	176.8
Israel, 1977	19.2	31.1	51.7	78.2	120.7	190.2	13.8	23.0	40.1	69.9	112.0	177.8
Yugoslavia, 1977	23.5	34.8	58.6	88.2	154.8	208.3	13.4	21.8	39.2	65.0	128.4	193.4
Canada, 1976	22.1	33.3	51.4	77.3	118.2	195.7	10.5	16.5	26.3	44.7	76.8	154.7
United States, 1978	24.1	34.4	52.4	80.7	116.0	172.6	12.1	16.9	27.2	47.1	75.1	135.4

Sources: United Nations, Demographic Yearbook, 1979, 1980; death rates for United States, 1978, "Final Mortality Statistics, 1978," Monthly Vital Statistics Report, Vol. 29, No. 6, Supplement (2), September 1980.

Table 5-16. Recent and Projected Values for Life Expectancy at Birth and at Age 65, for the United States, 1976 to 2050, and Best-Country Composite, 1976

Year and country	At birth				At age 65			
	Both sexes	Male	Female	Difference[1]	Both sexes	Male	Female	Difference[1]
United States:								
1978	73.3	69.5	77.2	7.7	16.3	14.0	18.4	4.4
1979 (prov.)	73.8	69.9	77.8	7.9	16.7	14.3	18.7	4.4
1980 (prov.)	73.6	(NA)	(NA)	(NA)	16.4	(NA)	(NA)	(NA)
1981-82 (est.)	74.4	70.7	78.3	7.6	17.2	14.6	18.9	4.3
Projections (middle series):								
2005	77.3	73.3	81.3	8.0	19.1	15.9	21.2	5.3
2050	79.3	75.1	83.6	8.5	20.8	17.2	23.2	6.0
Best-country composite, 1978[2]	76.9	73.8	79.9	6.1	17.2	14.8	19.1	4.3
Norway, 1978[3]	75.4	72.3	78.6	6.3	16.1	14.3	17.7	3.4
Sweden, 1978[4]	75.1	72.2	78.1	5.9	15.9	14.1	17.5	3.4
Japan, 1978[4]	74.7	72.2	77.4	5.2	(NA)	(NA)	(NA)	(NA)
Difference, United States and best-country composite, 1978	-3.6	-4.3	-2.7	1.6	-0.9	-0.8	-0.7	0.1

NA Not available.

[1] Excess of female over male.

[2] Composite of lowest age-specific death rates for countries with reliable data.

[3] Country with highest life expectation of birth among countries with reliable data.

[4] Countries with next highest life expectation at birth among countries with reliable data.

Source: U.S. Public Health Service, National Center for Health Statistics, "Final Mortality Statistics, 1978," Monthly Vital Statistics Report, Vol. 29, No. 6, Supplement (2), September 1980; "Provisional Statistics, Annual Summary for the United States, 1979," Monthly Vital Statistics Report, Vol. 28, No. 13, November 1980; Monthly Vital Statistics Report, "Provisional Data," Vol. 29, No. 13, September 1981; U.S. Bureau of the Census, unpublished U.S. life tables for 2005 and 2050, and United Nations, Demographic Yearbook, 1979: 1980.

Table 5-17. Life Expectation at Birth and at Age 65, by Sex, for Various Countries: Various Years From 1970 to 1978

Country and year	Male		Female		Excess of female over male	
	At birth	At age 65	At birth	At age 65	At birth	At age 65
Austria, 1977	68.5	(NA)	75.6	(NA)	7.1	(NA)
Czechoslovakia, 1977	67.0	(NA)	74.1	(NA)	7.1	(NA)
Denmark, 1977-78	71.5	13.7	77.5	17.1	6.0	3.4
Finland, 1978	68.5	12.3	77.1	16.2	8.6	3.9
France, 1977	69.7	13.2	77.8	17.2	8.1	4.0
Germany, West, 1976-78	69.0	12.6	75.6	16.2	6.6	3.6
Hungary, 1978	66.6	12.2	73.3	14.9	6.7	2.7
Italy, 1970-72	69.0	13.3	74.9	16.2	5.9	2.9
Netherlands, 1977	72.0	13.9	78.4	18.0	6.4	4.1
Norway, 1977-78	72.3	14.3	78.6	17.7	6.3	3.4
Sweden, 1974-78	72.2	14.1	78.1	17.5	5.9	3.4
England and Wales, 1974-76	69.6	(NA)	75.8	(NA)	6.2	(NA)
Yugoslavia, 1970-72	65.4	12.4	70.2	14.4	4.8	2.0
New Zealand, 1970-72	68.6	(NA)	74.6	(NA)	6.0	(NA)
Israel, 1978	71.5	14.2	75.8	15.7	4.3	1.5
Japan, 1976	72.2	(NA)	77.4	(NA)	5.2	(NA)
Canada, 1970-72	69.3	13.7	76.4	17.5	7.1	3.8
United States, 1978	69.5	14.0	77.2	18.4	7.7	4.4
USSR, 1971-2	64.0	(NA)	74.0	(NA)	10.0	(NA)

NA Not available.

Sources: United Nations, Demographic Yearbook, 1979, 1980; life expectancy for the United States, 1978, "Final Mortality Statistics, 1978," Monthly Vital Statistics Report, Vol. 29, No. 6, Supplement (2), September 1980.

Table 5-18. Comparison of Actual Values for Average Remaining Lifetime and Average Years Lived in Interval with Values Projected by the Social Security Administration: 1977-78

Age, sex, and mortality assumption	Average years of life remaining or in interval			Differences[1]	
		Projected 1977-78			
	Actual, 1978	Actuarial Study No. 46 (1957)	Actuarial Study No. 62 (1966)	Actuarial Study, No. 46	Actuarial Study, No. 62
AT BIRTH					
Male:					
Low	69.5	71.4	68.8	+1.9	-0.7
High		68.3	67.8	-1.2	-1.7
Female:					
Low	77.2	77.3	75.0	+0.1	-2.2
High		74.8	74.1	-2.4	-3.1
UNDER 65 YEARS					
Male:					
Low	59.8	60.5	59.4	+0.7	-0.4
High		59.3	58.9	-0.5	-0.9
Female:					
Low	62.0	62.3	61.5	+0.3	-0.5
High		61.5	61.2	-0.5	-0.8
AT AGE 65					
Male:					
Low	14.0	14.8	13.7	+0.8	-0.3
High		13.5	13.3	-0.5	-0.7
Female:					
Low	18.4	17.6	16.6	-0.8	-1.8
High		16.4	16.2	-2.0	-2.2

[1] Projected value minus actual value.

Sources: U.S. Public Health Service, National Center for Health Statistics, "Final Mortality Statistics, 1978." Monthly Vital Statistics Report, Vol. 29, Supplement (2), September 1980; U.S. Social Security Administration Division of the Actuary, "Illustrative United States Population Projections," Actuarial Study, No. 46, by T.N.E. Greville, May 1957; U.S. Social Security Administration, Office of the Actuary, "United States Population Projections for OASDHI Cost Estimates," Actuarial Study, No. 62, by Francisco Bayo, December 1966.

Table 5-[illegible] Projections of Life Expectation at Birth and at Age 65, by Sex, Prepared by the Social Security Administration: November 1981

(Figures in parentheses represent alternative low and high projections)

Age and sex	1[illegible][1] (base year)	2000	2050	Increase	
				1980-2000	1980-2050
At birth:					
Male	69.8	72.9 (71.4-75.9)	75.0 (72.4-80.2)	3.1 (1.6-6.1)	5.2 (2.6-10.4)
Female	77.7	81.1 (79.4-84.9)	83.6 (80.6-90.6)	3.4 (1.7-7.2)	5.9 (2.9-12.9)
Difference[2]	7.9	8.2 (8.0-9.0)	8.6 (8.2-10.4)	0.3 (0.1-1.1)	0.7 (0.3-2.5)
At age 65:					
Male	14.3	15.8 (15.0-17.4)	17.3 (15.7-20.8)	1.5 (0.7-3.1)	3.0 (1.4-6.5)
Female	18.7	21.1 (19.8-24.2)	23.2 (20.8-29.3)	2.4 (1.1-5.5)	4.5 (2.1-10.6)
Difference[2]	4.4	5.3 (4.8-6.8)	5.9 (5.1-8.5)	0.9 (0.4-2.4)	1.5 (0.7-4.1)

[1] Assumed to equal the estimated figures for 1979.

[2] Excess of female over male figure.

Source: U.S. Social Security Administration, Office of the Actuary, "Social Security Area Population Projections, 1981," by Joseph F. Faber and John C. Wilkin, Actuarial Study No. 85, July 1981, table 18.

Chapter 6.
Health

INTRODUCTION

There are many factors which determine the overall quality of life of an individual. These include the individual's health, economic situation, family status, kinship and other support network, housing conditions, use of leisure time, security and safety, and the feeling of satisfaction regarding these conditions and experiences. The discussion in this chapter relates to the health status of the elderly as measured by the extent of acute and chronic conditions, injuries, and disability and the extent to which health services are used. Some of the other factors reflecting or affecting the quality of life of the elderly, such as living arrangements and income status, are discussed in the following two chapters, which, more generally, are concerned with the social and economic characteristics of the older population.

The data presented here are drawn principally from the National Health Interview Survey, which is conducted by the Census Bureau on behalf of the National Center for Health Statistics. This survey covers the civilian noninstitutional population of the United States, excluding the population in institutions and the military population.[72] (Only about 5 percent of the population aged 65 and over currently resides in institutions, and less than 0.1 percent of the population 65 years and over is in the Armed Forces.) Some information on the health status of the population is also available from the 1980 and 1970 censuses.[73]

ACUTE CONDITIONS AND INJURIES

According to data for 1977-78, the population 65 years of age and over had a much lower incidence of acute conditions (111 per 100 persons) than the population under 65 years of age (232 per 100 persons). (See table 6-1.) However, the older population had a disproportionate number of restricted activity days as a result of these acute conditions: 1,207 days per 100 persons aged 65 and over compared with 948 days per 100 persons under 65 years of age. This difference in restricted activity days associated with acute conditions is explained by comparing the average days of restricted activity per acute condition for the two age groups. For the population aged 65 and over in 1977-78 this figure was 10.9 days, while for persons under age 65 it was only 4.1 days. Thus, although the older population suffered from less than half as many acute conditions per person, their average number of days of restricted activity per acute condition was more than twice that for the younger population, and hence, they had a larger number of days of restricted activity per person.

The same relationship appears, but in more pronounced degree, when considering injuries. Although the older population had only 67 percent as many injuries per person in 1978 as the younger population, older persons experienced more than twice as many days of restricted activity from injuries per person. This reversal is explained by the fact that the average number of days of restricted activity per injury was far less for those under age 65 (9.3 days) than for those aged 65 and over (29.9 days).

Respiratory conditions accounted for more than half of all acute conditions (acute illnesses plus injuries) among those aged 45 and over (table 6-2).[74] Injuries accounted for another sixth. The incidence rate for respiratory conditions for this age group was much lower than for the total population, however, amounting to only three-fifths of the rate for the total population. Similarly, the incidence rate for injuries for persons 45 years and over was only two-thirds of the corresponding incidence rate for the total population.

CHRONIC CONDITIONS

A very large portion of the elderly suffer from chronic conditions, many from multiple chronic conditions. All or nearly all the residents of long-term care facilities may be assumed to suffer from multiple chronic conditions and functional impairments. About 5 percent of the population 65 years and over resides in nursing homes, and a small additional percentage resides in chronic disease hospitals, psychiatric hospitals, Veterans Administration hospitals, and other long-term care facilities. The most common primary health conditions in the "resident" population are arteriosclerosis (hardening of the arteries), senility, cerebrovascular disease (stroke), and mental disorders, and these are all likely to be associated with functional impairments.[75]

---

[72] Details of the survey design and reliability of estimates may be found in the reports cited.

[73] Data on the health of the U.S. population are presented in U.S. Public Health Service, National Center for Health Statistics, *Vital and Health Statistics*, Series No. 10 (various numbers) and *Health in the United States* (annual). See particularly U.S. Public Health Service, National Center for Health Statistics, *Vital and Health Statistics*, "Current Estimates from the Health Interview Survey, United States, 1974," by Peter W. Ries, Series 10, No. 100, September 1975, and "Age Patterns in Medical Care, Illness, and Disability, United States, 1968-1969," by Christy Namey and Ronald W. Wilson, Series 10, No. 70, April 1972; and U.S. Public Health Service, National Center for Health Statistics, *Health in the Later Years of Life*, 1971, and *Health in the United States, 1975*, 1976.

[74] See also U.S. Public Health Service, National Center for Health Statistics, "Acute Conditions: Incidence and Associated Disability, United States, July 1977-June 1978," by Peter W. Ries, *Vital and Health Statistics*, Series 10, No. 132, September 1979.

The prevalence of chronic conditions in the general elderly population is much lower than among people in long-term care facilities. Some 86 percent of the noninstitutional population 65 years and over reported a chronic disease in the National Health Interview Survey.[76] This figure undoubtedly understates the extent of chronic diseases because some persons have conditions they do not know about or deliberately fail to report. Common chronic conditions reported for the elderly living in the community are arthritis, impairments of vision and hearing, heart conditions, and hypertension. Each of these were reported for more than 20 percent of the elderly.

The elderly are much more likely than younger people to have a chronic condition and to be limited in their activity as a result of that condition. In 1978, 45 percent of persons aged 65 years and over were limited in their activity as a result of a chronic condition, while only 10.5 percent of those under age 65 were limited in their activity from such conditions (table 6-1). Most of these, 38 percent and 7 percent of the population in these age categories respectively, were limited in their major activity. The leading chronic conditions causing limitation of activity for those aged 65 and over in 1979 were arthritis and rheumatism, heart conditions, hypertension without heart involvement, impairments of the lower extremities and hips, and impairments of the back or spine (table 6-3).[77] In 1969-70, these conditions were also the ranking chronic conditions causing limitation of activity, but they made up a much smaller part of the total of such conditions (table 6-3). The first two conditions listed accounted for half of the total in 1979. Other conditions causing limitation of activity in both years were visual impairments and emphysema (mainly males).

An indication of the more severe effects of chronic conditions is given by measures of limitation of mobility. In 1972, the latest year for which pertinent data are available, 17.6 percent of those aged 65 and over and 1.6 percent of those under age 65 were limited in their mobility as a result of a chronic condition (table 6-4). About 5 percent of the elderly were confined to the house and another 12 1/2 percent had trouble getting around alone.

TRENDS IN MORBIDITY

Since the turn of the century, there has been a pronounced shift in the pattern of the causes of morbidity, as with mortality, from the predominance of infectious and parasitic diseases to chronic endogenous and "self-imposed" conditions. Three categories of causes of morbidity rose markedly relative to others: first, chronic diseases, such as diseases of the heart, cancer, cerebrovascular lesions, diabetes, kidney disease, arthritis and rheumatism, and emphysema; second, accidents, especially traffic accidents; and third, conditions either largely caused by or greatly aggravated by stress, such as drug dependency, mental illness, peptic ulcers, attempted suicides, and hypertension. Although morbidity and mortality have both declined sharply since 1900, the improvement in morbidity has been much less than that in mortality.[78]

The measures suggest that no major improvements in the health status of the elderly population occurred during the period 1965 to 1979. (The year 1965 is the earliest year for which morbidity and disability information is available for the elderly from the Health Interview Survey.) The proportion of individuals 65 years and over with limitations of activity rose between 1969-70 and 1979 (from 42 percent to 46 percent), and in particular, the proportion with limitations associated with the leading chronic diseases rose in this period (table 6-3). For example, the age-adjusted proportion of persons with definite hypertension rose between 1960-62 and 1971-75.

Restricted activity days per person for the population 65 years and over increased from 38 in 1965 to 42 in 1979. An apparent exception may support the generalization. The number of work days lost per employed person aged 65 and over decreased from 8 days in 1965 to 4 days in 1978. This drop may be a result of improvements in retirement benefits, permitting those in poor health to retire earlier and, hence, causing a selective retention of healthier employees.[79] "Bed-disability days per person" for the population 65 years and over was about the same in 1979 as in 1965 (14.2 vs. 13.7). Stability or retrogression in the health status of the elderly occurred in the 1965-79 period even though the population 65 years and over experienced a reduction in death rates in the period.[80]

SEX DIFFERENCES

As indicated earlier, older males have higher death rates than older females for most leading causes of death. However, data based on self-reports of health conditions obtained in the National Health Interview Survey in 1978 indicate that a higher percentage of older females have one or more chronic conditions than older males. In addition, elderly females have higher incidence rates for acute conditions (121 vs. 97 per 100 persons) and injuries (26 vs. 16 per 100 persons). Currently employed elderly females showed a larger number of days of work loss per person per year than currently employed elderly males in 1978 (6.5 vs. 2.9). Moreover, elderly females experienced a much larger number of days of restricted activity per person per year associated with acute conditions (1,361) and with injuries (827) than elderly males in 1978 (988 and 412, respectively). In general, in each category of "disability" the proportion or rate for older females was higher than for older males, with the exception of the chronic conditions involving limitations of activity, especially limitations of major activity. For these conditions the proportion for females 65 and over was 6 to 8 percentage points lower than for males in 1978.

---

[75] U.S. Public Health Service, National Center for Health Statistics and National Center for Health Services Research, "Elderly People: The Population 65 Years and Over," by Mary Grace Kovar, Part A, Chapter 1, in *Health, United States: 1976-77*, 1978.

[76] U.S. Public Health Service, *Health, United States, 1976-77, op. cit.*, Chapter 1, p. 10.

[77] See also U.S. Public Health Service, National Center for Health Statistics, "Limitation of Activity Due to Chronic Conditions, United States, 1974," by Charles S. Wilder, *Vital and Health Statistics*, Series 10, No. 111, June 1977.

[78] Abdel R. Omran, "Epidemiologic Transition in the United States: The Health Factor in Population Change," *Population Bulletin*, Vol. 32, No. 2, May 1977, Population Reference Bureau, Inc., Washington, D.C.

[79] U.S. Public Health Service, "Elderly People: The Population 65 Years and Over," by Mary Grace Kovar, Part A, Chapter 1, in *Health, United States, 1976-77*, 1978.

[80] A. Colvez and M. Blanchet, "Disability Trends in the United States Population, 1966-76: Analysis of Reported Cases", *American Journal of Public Health*, Vol. 71, 1981, pp. 464-471.

This seeming reversal—that the "unhealthier" female sex is also the one less likely to die—has at least two possible underlying explanations. First, diseases for which males show an excess predominate as causes of death while those for which females show an excess predominate as causes of sickness. For instance, the greatest female excess occurs for acute conditions. These are the most common causes of illness but are rare causes of death. On the other hand, most leading causes of death (which are also chronic conditions) show a male excess in both morbidity and mortality. Second, a large part of the sex-reversal in morbidity and mortality may be due to the interview situation and patterns of behaviour during illness. Proxy respondents tend to underreport morbidity, and a majority of proxy interviews are given by respondent females reporting on males who are absent. This practice would result in a "sex bias"; that is, male morbidity would be understated. Females are more likely to seek diagnosis and treatment when ill, since they generally have fewer constraints on their time, are more likely to envisage doctors' visits as a form of social activity, are more accustomed to secure medical check-ups (e.g., pregnancy), and have less psychologic resistance to admitting illness and to seeking help when ill. In a comparison of Health Interview Survey data and clinical data, it has been found that the sex-reversal in morbidity and mortality does not appear in the clinical data.[81]

RACE DIFFERENCES

Data on the health of the elderly population for race groups are very limited. These data suggest that, overall, the health situation of elderly Blacks is poorer than for elderly Whites. A comparison of the races with respect to limitation of activity due to chronic conditions is possible with data from the 1974 Health Interview Survey. For the population 65 years and over, 56 percent of Black and other races had some limitation in activity as compared with 45 percent of Whites.[82] Incidence and prevalence data for some conditions are available separately for Whites and Blacks according to age from various National Health Interview Surveys. For example, the proportion of Blacks 65 to 74 years old with definite hypertension in 1971-75 (45 percent) far exceeded the proportion for Whites (33 percent). Data on work disability are available for race groups from the 1970 census for the population under age 65 only. This material is discussed below.

WORK DISABILITY

The 1970 census included a question on work disability for persons 18 to 64 years of age. Work disability was defined as a health or physical condition which limits the kind or amount of work a person can do at a job. Percentages of the population in specified groups reporting a work disability are as follows:

Age and work status	White		Black	
	Male	Female	Male	Female
18 to 64 years:				
In labor force	8.6	5.5	8.8	7.8
Not in labor force .	36.0	12.9	41.1	23.4
55 to 59 years:				
In labor force	14.0	9.1	14.7	13.4
Not in labor force .	69.9	26.3	73.7	46.1
60 to 64 years:				
In labor force	16.6	10.6	17.3	16.4
Not in labor force .	60.4	30.1	69.8	49.9

Source: U.S. Bureau of the Census, Census of Population: 1970, *Persons with Work Disability*, Subject Reports, Final Report PC(2)-6C, January 1973.

It can be seen that the proportion of persons 55 to 64 years old with a work disability is much greater for those not in the labor force than for those in the labor force, especially males. This finding is not surprising since for those aged 55 to 64, especially males, separation from the labor force is often the consequence of a work disability. It is also evident from these figures that a higher percentage of males have a work disability than females, particularly for Whites, and a higher percentage of Blacks have a work disability than Whites, most noticeably among females.

The 1980 census included a question concerning health conditions that limit the kind or amount of work a person can do at a job, prevent the person from working at a job, or limit or prevent the person from using public transportation. The information was collected for the population aged 65 years and over as well as for the younger "adult" population and will be tabulated in combination with various characteristics of the population. On the basis of its field experience and a preliminary examination of the completed 1980 census questionnaires, the Census Bureau has serious concerns about the accuracy of these data for the elderly. Pretests of the question on disability had shown that the responses were subject to a high degree of inconsistency and that a large proportion of the cases were not reported and had to be allocated ("inferred" and assigned). Accordingly, the general reliability of the data on disability will have to be carefully assessed before any detailed statistics can be published. The provisional estimates based on the census for the proportion of the population 65 years and over with a "public transportation disability" is 14.9 percent; for the population 16 to 64 years the corresponding figure is 1.8 percent.

---

[81] Lois M. Verbrugge, "Sex Differentials in Morbidity and Mortality in the United States," *Social Biology*, Vol. 23, No. 4, pp. 275-296, Winter 1976.

[82] National Center for Health Statistics, "Limitation of Activity Due to Chronic Conditions, United States, 1974," by Charles S. Wilder, *Vital and Health Statistics*, Series 10, No. III, June 1977.

UTILIZATION OF HEALTH CARE SERVICES

This section is concerned with the health services utilized by the elderly population and the cost involved in these services. The services discussed include physician and dentist care, hospital care, and nursing-home care. The services are measured in terms of numbers of visits to physicians and dentists; admissions, discharges, days of care, and length of stay in hospitals, and numbers of residents in nursing homes.[83]

Physician and dentist visits. Above early childhood, the average number of physician visits increases directly with age and the rise accelerates in the older ages. Persons 65 years and over make on the average two visits per person per year more than those under age 45 (table 6-5). Physician visits per person per year numbered 6.4 for persons 65 years and over and 4.4 for persons under 45 in 1980. There was little change in the average number of visits of elderly persons to physicians in the last decade; the peak figure was 6.9, and the low figure was 6.3.

In 1980, males made fewer physician visits per person per year (4.0) than females (5.4). The average number of visits per year for males remained almost constant during the 1970-79 period, while the figure for females showed a moderate rise to 5.7 in 1975 from a low of 5.1 in 1970.

Most elderly persons do not visit a dentist and, in spite of greater need, are less likely to visit a dentist than persons under age 65. Over two-thirds of the elderly did not visit a dentist in 1975.[84] Persons 65 years and over visited a dentist 1.4 times on the average in 1980, while persons under 65 visited a dentist 1.7 times (table 6-5). Lack of dental care is a serious problem among the elderly. Half of the elderly are edentulous (i.e., have no natural teeth) and about 44 percent of the edentulous elderly need dental care in order to have properly fitting, useful dentures. Financial reasons appear to be a significant factor in the falling-off of visits and the inadequacy of dental care in older age.

Hospital care. As expected, the elderly show far higher indices of utilization of hospitals than the rest of the population. For the population 65 years old and over the admission rate to short-term hospitals was over twice as great as for the population as a whole (354 vs. 160 admissions per 1,000 population in 1979). (See table 6-6.) Although admission rates for the older and younger segments of the population increased in the seventies, the rate for older persons increased more rapidly in this period. The Medicare amendment to the Social Security Act, which went into effect in 1966, greatly influenced the trend of hospital admissions of elderly persons. The rate of admissions of elderly persons to short-term hospitals increased slowly between 1960 and 1965, grew more rapidly during the late sixties and early seventies, and then nearly stabilized in the late seventies.

The average length of hospital stay of persons 65 years and over substantially exceeds that for the population as a whole, the difference being 3 to 4 days in 1970 to 1979. For 1979, the figures on length of stay were 10.6 days and 7.6 days. During the seventies, the average length of stay decreased for both elderly persons and persons under age 65, but the decrease was greater for the elderly.

Patient admission and discharge rates, average hospital stay, and days-of-hospital-care ratios generally increase steadily with increasing age after childhood. "Days of hospital care per 1,000 persons" was 3 1/2 times greater for elderly persons than for the general population in 1979 (table 6-7). This ratio is much greater than the corresponding figure for the hospital discharge rate because the average stay per patient was much longer for elderly persons. "Days of hospital care per 1,000 persons" was somewhat greater for elderly males (4,297) than for elderly females (4,112); although the average stay figure was slightly lower for males than females, the discharge rate for males was far higher than for females.

A study on the use of Medicare benefits made by Davis provides additional information on the trend and on the socioeconomic characteristics of beneficiaries.[85] She found a difference in the rate of utilization of hospital care before and after the advent of Medicare, including a considerable difference in the hospital admission rate. The rate of hospitalization decreased after the Medicare program went into effect for the population under age 65 and increased for the population 65 years and over. Davis' analysis showed also that, after the introduction of Medicare and Medicaid, there was a decrease in the disparity of the hospitalization rates of Blacks and Whites. The reduction of a financial barrier to care changed the pattern of use by Blacks, who previously had lower levels of utilization. The advent of Medicare also had a great impact on the use of nursing-home care, which is considered next.

---

[83] See Mary Grace Kovar, "The Elderly Population: Use of Medical Care Services by Men and Women in their Middle and Later Years," unpublished paper presented at the annual meeting of the American Public Health Association, Detroit, August 1980.

[84] U.S. Public Health Service, *Health, United States, 1976-77*, *op. cit.*, Chapter 1, p. 16.

[85] Karen Davis, "Equal Treatment and Unequal Benefits: The Medicare Program," *Milbank Memorial Fund Quarterly*, Vol. 53, No. 4, 1975.

Nursing-home care. The first surveys of nursing homes conducted on a regular basis were those of 1963, 1964, and 1969. These three surveys include data not only on nursing homes but also on personal-care homes. Later surveys, starting with the 1973-74 survey and including those of 1976 and 1977, collected data only on nursing homes. Nevertheless, valid comparisons can be made with the earlier surveys, since only about 5 percent of the population covered in the earlier surveys were in personal-care homes.

There were 1,303,000 residents in nursing homes in 1977. The vast majority (86 percent) of the residents were 65 years or over (table 6-8). Seven out of ten (70 percent) were 75 years or over, and 1 out of 3 (35 percent) was 85 or over. Less than 1 out of 20 persons over age 65 (4.7 percent), but nearly 1 out of 4 persons over 85 (24 percent), resided in a nursing home.

The number of nursing-home residents in 1964 (554,000) was far smaller than the number today and elderly nursing-home residents made up only 2.7 percent of the population over age 65 in that year. A much lower proportion of the residents was over age 85 (27 percent).

Seven out of every ten residents (71 percent) in nursing homes are female. Three out of four of those over age 65 (74 percent) and 4 out of 5 of those over age 85 (80 percent) are female. The proportion of females among residents has been rising and is much higher now than in the sixties, especially at the ages over 75:

Age group	Percent			
	1977	1973-74	1969	1964
All ages	71	70	69	65
Under 65 years	54	46	52	45
65 and over	74	72	71	68
65 to 74 years	62	60	63	62
75 to 84 years	74	74	72	68
85 and over	80	76	76	72

By 1969, after the Medicare and Medicaid programs had been in operation for a few years, the age distribution of residents in nursing homes was not very different from that in 1964 (except for the marked rise in the proportion 85 years and over). The number of residents and their proportion in the population increased greatly, particularly for the very old, however. The number of residents of nursing homes increased between 1964 and 1969 at an average annual rate of 7.7 percent, and elderly nursing-home residents made up 3.7 percent of the population over age 65 in 1969.

Two more recent surveys, those of 1973-74 and 1977, implied somewhat smaller rates of increase in the number of residents of nursing homes over previous surveys than that of 1969. The figures for 1977 and 1973-74, imply average annual increases of 5.5 percent and 6.2 percent between 1977 and 1973-74 and between 1973-74 and 1969, respectively.[86] The increases in the number of elderly persons in nursing homes were not primarily the result of increases in the number of elderly persons in the general population but of increases in the rate of nursing-home utilization.

It is of interest to compare the elderly institutionalized population with its noninstitutional counterpart. Such a comparison indicates several major differences in the characteristics of the two populations. Although females exceed males in both groups, the excess is far more pronounced among the nursing-home population. This fact suggests that females enter nursing homes at a greater rate than males, although a relatively higher death rate for males over females in nursing homes than in the general population may play a part. In 1977, the noninstitutional elderly population consisted of 59 percent females and 41 percent males, whereas the elderly population in nursing homes in that year consisted of 74 percent females and 26 percent males.

Another difference between the noninstitutional population and the nursing-home population is in the distribution of the two groups by marital status. While, in 1977, 54 percent of the elderly noninstitutional population was married, only 12 percent of the elderly nursing-home population was in this category. Among the elderly noninstitutional population, a little over 36 percent was widowed, in contrast to 62 percent of the elderly nursing-home population. Another pronounced difference between the two populations is in the age distribution. While 38 percent of the elderly noninstitutional population 65 years old and over was 75 years old or over, 81 percent of the elderly nursing-home population fell in this higher age group (table 6-8).[87] It is suggested that persons are more likely to enter a nursing home if they enjoy greater longevity (i.e., are relatively old) and if they are not currently married; these conditions are more likely to describe women than men.

Cost of health care. In 1978, personal health care expenditures for the elderly amounted to $49,367 million or 29 percent of the total personal health-care bill. Hospital care, nursing-home care, and physicians' services comprised the major health-care expenses of the elderly in that order (table 6-9). For the population under age 65, of course, the contribution of nursing-home care was far less than the contributions of hospital care and physicians' services.

Per capita expenditures for health-care services generally increase with age, as does the use of health-care services.[88] In 1978, the health-care expenditure per capita was $2,026 for ages 65 and over, as compared with $597 for ages under 65. The relative difference in per capita expenditures was over 3 to 1. The relative difference between the age groups was somewhat over 3 to 1 for hospital care and somewhat less than 3 to 1 for physicians' services.

---

[86] In addition to the sources of table 6-8, see U.S. Bureau of the Census, 1976 Survey of Institutionalized Persons: A Study of Persons Receiving Long-Term Care, Current Population Reports, Series P-23, No. 69, 1978.

[87] U.S. Public Health Service, National Center for Health Statistics, "The National Nursing Home Survey: 1977 Summary for the United States," *Vital and Health Statistics*, Series 13, No. 43, July 1979; and U.S. Bureau of the Census, *Marital Status and Living Arrangements: March 1977*, Current Population Reports, Series P-20, No. 323, April 1978.

There has been a considerable increase in the overall costs of health-care services in recent years. The major factors related to the increase in overall costs have been price inflation, changes in equipment and services (including technological developments), and population growth. Gibson has estimated that in 1979 price inflation accounted for 66 percent of the overall increase in health-care expenditures, changes in equipment and services accounted for 27 percent, and population growth accounted for 7 percent.[89] The factor of population growth would allow both for increasing numbers of persons and changes in age-sex distribution, including particularly the rapid rise in the number of elderly persons and the rise in the proportion of extreme aged among them. Price inflation in the health-care area has tended to exceed general price inflation. It is evident that inflation and the added costs of developments in equipment and services can easily exceed the cost resulting from population changes.

Per capita costs for personal health care for the elderly showed a continuous marked rise from $472 in 1965 to $2,026 in 1978.[90] During the period 1965-70, the per capita costs of health care nearly doubled. The costs of nursing-home care showed far steeper rates of increase than the costs of hospital care and physicians' services. The cost for hospital-care services doubled, the cost of physicians' services increased by over 60 percent, and the cost for nursing-home care more than tripled during the period 1965-70. These increases were largely due to extensive utilization of services and much less to price inflation. In the period 1970-78, per capita health-care expenditures for persons 65 years and over increased nearly 2 1/3 times, with relatively little variation for the principal categories of health care. In these years, inflation was the major factor in the increase of the cost of health care.

Per capita personal health-care costs increased at about 11 percent per year in the period 1970-78. The general inflation rate based on consumer prices grew by 6.5 percent per year in 1970-78, and the annual inflation rate in medical-care costs in 1970-78 was 7.5 percent. The differences between the general inflation rate and the change in per capita expenditures for health care can be accounted for by the cost of technological improvements and excessive inflation in the health-care industry. The difference in inflation rates confirms the fact of excessive inflation in the health-care industry in 1970-78. In 1979 and 1980, however, medical-care costs per capita rose less rapidly than the general consumer price index.

According to data obtained in the Survey of Income and Education conducted by the U.S. Bureau of the Census in 1976, nearly all persons over age 65 have some type of health-care insurance, commonly both public and private insurance. A far smaller proportion of younger persons have such insurance:

Age group	Total	Without coverage	With coverage			
			Total	Private only	Public only	Public and private
All ages	100.0	10.2	89.8	63.4	12.7	13.6
25 to 44 years	100.0	9.3	90.7	72.0	8.3	10.3
44 to 64 years	100.0	7.6	92.4	70.0	8.8	13.5
65 and over	100.0	1.0	99.0	1.5	37.7	59.8

Source: U.S. Congress, Congressional Budget Office, *Profile of Health Care Coverage: The Haves and Have-Nots, 1979.*

Many types of health care are very inadequately covered by present insurance programs, e.g., office and home visits, dental care, prescriptions of drugs, private duty nursing, and visiting nurse service.

PERSONAL FACTORS IN HEALTH

As suggested in the preceding chapter, the health status of the population could be improved greatly without major new developments in diagnostic and therapeutic modalities or the discovery of techniques of slowing the aging process. Such improvements could be effected through the extension of existing methods of health care and treatment to geographic and socioeconomic segments of the population not now fully covered, the modification of personal behavior, community action, changes in the delivery of health-care services, and improvements in the capacitation of health-care personnel. Problems exist now in the form of maldistribution of health-care resources, socioeconomic differences in health risks, the adverse effect of certain types of personal behavior and environmental conditions on health, and the failure of many health-care practitioners to employ the latest knowledge and techniques. Community action would be concerned, for example, with health education efforts, pollution control, and industrial safety.

---

[88] Charles F. Fisher, "Differences by Age Groups in Health Care Spending," *Health Care Financing Review*, Vol. I, No. 4, 1980.

[89] Robert M. Gibson, "National Health Expenditures, 1979," *Health Care Financing Review*, Summer 1980.

[90] For illustrative projections of the costs of health care, see Statement of J. S. Siegel, p. 49, Ninety Fifth Congress, Second Session, Joint Hearing before the Select Committee on Population, U.S. House of Representatives, and the Select Committee on Aging, May 24, 1978, *Consequences of Changing U.S. Population, Demographics of Aging*, Vol. I.

Certain personal habits and aspects of lifestyle have been linked to various health conditions, particularly such endogeneous conditions as cancer, cardiovascular diseases, and emphysema.[91] These personal habits and elements of lifestyle include cigarette smoking, persistent stress at work and home, inadequate sleep (less than 7 hours), not eating breakfast, excessive use of alcohol, lack of regular exercise, not maintaining moderate weight, and snacking.

The evidence for the indirect effects of pronounced obesity on conditions like diabetes, hypertension, and heart disease is strong.[92] There is also strong evidence for the adverse effects of diets with excessive fat on the health of middle-aged and older persons. Fat has been indicted for its role in malignant neoplasms and cardiovascular diseases; similarly excessive salt is a contributing agent in cardiovascular diseases. The evidence on the relation of smoking and health (e.g., chronic obstructive lung disease) is also quite strong.[93]

According to the National Health Interview Survey of 1977, large segments of the elderly population as well as of the middle-aged population have personal habits that subject them to excessive health risks (table 6-10). Thirty-one percent of persons over age 55 eat snacks every day and 12 percent never eat breakfast. About 23 percent of the population 55 years and over typically has less than 7 hours of sleep each day and about 32 percent has a weight 20 percent in access of an acceptable average weight. Nearly 6 out of 10 persons 45 years and over do not exercise regularly according to survey responses in 1975. About 28 percent of the population 45 years and over are smokers according to survey responses in 1979.

There is evidence that regular mental and social activity is a positive factor in maintaining health and effective functioning in later years. Continuing meaningful social roles and having a large number of satisfying and appropriate interpersonal "transactions" may be as important in maintaining health in later years as the personal habits enumerated.

---

[91] Mervyn Susser, "Industrialization, Urbanization, and Health: An Epidemiological View," pp. 273-303, in *International Population Conference, Manila, 1981*, International Union for the Scientific Study of Population, Liège, 1381; Elena Nightingale, "Prospects for Reducing Mortality in Developed Countries by Changes in Day-to-Day Behaviour," *International Population Conference, Manila, 1981*, pp. 207-232, International Union for the Scientific Study of Population, Liège, 1981.

[92] T. Dwyer and B.S. Hetzel, "A Comparison of Trends of Coronary Heart Disease Mortality in Australia, England and Wales, and U.S.A. with Reference to Three Major Risks Factors—Hypertension, Cigarette Smoking, and Diet," *International Journal of Epidemiology*, Vol. 9, pp. 65-71, 1980.

[93] S.W. Burney, "Morbidity and Mortality in a Healthy Aging Male Population: 10-Year Survey," *Gerontologist*, Vol. 12, pp. 49-54, 1972.

Table 6-1. Selected Health Indicators for the Total Population, the Population Under 65 Years of Age, and the Population 65 Years and Over, by Sex: 1978

(Relates to the civilian noninstitutional population)

Indicator	Both sexes			Male			Female		
	All ages	Under 65 years	65 years and over	All ages	Under 65 years	65 years and over	All ages	Under 65 years	65 years and over
Days of restricted activity per person per year[1]	18.8	16.2	40.3	16.3	14.4	35.1	21.1	17.9	43.9
Days of bed disability per person per year	7.1	6.2	14.5	6.0	5.2	14.2	8.2	7.3	14.8
Days of work-loss per currently employed person per year[2]	5.2	5.3	4.2	4.9	4.9	2.9	5.7	5.7	6.5
Number of persons injured per 100 persons per year[3]	31.6	32.7	21.9	36.9	39.0	16.1	26.6	26.7	26.0
Days of restricted activity associated with injury per 100 persons per year	341.6	304.1	655.8	340.4	333.2	411.5	342.7	276.0	827.1
Days of bed disability associated with injury per 100 persons per year	86.4	77.4	161.8	70.7	66.1	116.9	101.0	88.3	193.2
Number of acute conditions per 100 persons per year[3] [4]	219.0	231.8	111.0	206.0	216.8	97.3	231.1	246.2	120.6
Days of restricted activity associated with acute conditions per 100 persons per year[4]	975.5	948.1	1,207.1	844.1	829.8	987.7	1,098.1	1,062.2	1,361.3
Days of bed disability associated with acute conditions per 100 persons per year[4]	443.7	436.1	508.0	368.1	361.5	435.3	514.2	508.1	559.0
Percent with chronic conditions:[5]									
With limitations of activity	14.2	10.5	45.0	14.3	10.9	48.2	14.1	10.1	42.7
With limitation in major activity	10.6	7.3	38.3	10.8	7.6	43.2	10.3	6.9	34.9

[1] The figures for 1979 for both sexes are: All ages, 19.0; under 65 years, 16.2; and 65 years and over, 41.9.

[2] Work-loss reported for currently employed persons aged 17 years and over.

[3] Includes both acute illnesses and injuries. All conditions involving neither restricted activity nor medical attention are excluded from these figures. See table 6-2 for selected data for 1980.

[4] These figures are for the July 1977 to June 1978 period.

[5] See table 6-3 for data for 1979 (both sexes only).

Sources: Based on the National Health Interview Survey. U.S. Public Health Service, National Center for Health Statistics, "Current Estimates from the Health Interview Survey: United States-1978," by Jimmie D. Givens, Vital and Health Statistics, Series 10, No. 130, November 1979, and "Acute Conditions, Incidence and Associated Disability, United States, July 1977-June 19 8," by Peter W. Ries, Vital and Health Statistics, Series 10, No. 132, September 1979.

Table 6-2. Incidence Rates for Acute Conditions, for the Total Population, the Population Under 45 Years, and the Population 45 Years and Over, by Sex: 1980

(Acute conditions comprise acute illnesses and injuries. Rates represent acute conditions per 100 population)

Age group and sex	All acute conditions	Infective and parasitic diseases	Respiratory		Digestive system	Injuries	All other acute conditions
			Upper	Other[1]			
BOTH SEXES							
All ages	222.2	24.6	57.0	59.2	11.4	33.4	36.6
Under 45 years	263.2	31.2	69.1	67.2	13.8	38.6	43.2
45 years and over	130.6	9.8	30.0	41.2	6.0	21.6	22.0
MALE							
All ages	204.1	23.4	[illegible]	52.9	11.2	39.0	26.6
Under 45 years	242.4	29.5	61.7	60.5	13.6	47.0	30.2
45 years and over	111.1	8.7	24.8	34.6	5.6	19.5	17.9
FEMALE							
All ages	239.0	25.7	62.7	65.0	11.6	28.1	45.9
Under 45 years	283.6	32.9	76.3	73.9	14.1	30.4	55.9
45 years and over	146.9	10.7	34.4	46.7	6.4	23.3	25.4

[1] Includes influenza and other respiratory conditions.

Source: U.S. Public Health Service, National Center for Health Statistics, "Current Estimates from the National Health Interview Survey, United States 1980," by Susan S. Jack, Vital and Health Statistics, Series 10, No. 139, December 1981.

Table 6-3. Percent of the Population With Activity Limitations and Percent of Persons With Limitations Who Are Limited by Selected Chronic Conditions, for Broad Age Groups: 1979 and 1969-70

(Covers civilian noninstitutional population. Conditions are classified according to the Eighth Revision of International Classification of Diseases for 1969-70 and according to the Ninth Revision for 1979)

Condition	1979				1969-70			
	All ages	Under 45 years	45 to 64 years	65 and over	All ages	Under 45 years	45 to 64 years	65 and over
PERCENT OF ALL PERSONS								
Activity limitation	14.6	6.9	24.1	46.0	11.7	5.3	19.5	42.3
In major activity	10.9	4.2	18.6	39.2	9.1	3.3	15.7	37.0
PERCENT OF PERSONS WITH LIMITATIONS								
Persons limited in activity[1]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Arthritis and rheumatism	17.0	5.1	20.1	25.3	14.1	4.4	15.7	21.2
Heart conditions	16.4	4.4	20.7	23.9	15.5	6.3	19.0	20.5
Hypertension without heart involvement	9.2	3.0	12.1	12.2	4.6	1.8	5.2	6.4
Impairment of back/spine	9.4	14.1	9.7	4.6	6.9	10.6	7.8	2.8
Impairment of lower extremities and hips	7.5	9.8	7.0	5.8	6.7	8.9	6.0	5.3

[1] Percentages are not additive because more than one condition can be reported by a respondent as a cause of limitation.

Source: U.S. Public Health Service, National Center for Health Statistics, "Current Estimates from the National Health Interview Survey: United States, 1979," by Susan S. Jack, Vital and Health Statistics, Series 10, No. 136, April 1981, and "Limitation of Activity Due to Chronic Conditions, United States, 1969 and 1970," by Charles S. Wilder, Vital and Health Statistics, Series 10, No. 80, April 1973.

Table 6-4. Percent Distribution of the Total Population, the Population Under 65 Years of Age, and the Population 65 Years and Over by Limitations of Mobility Due to Chronic Conditions, by Sex: 1972

(Relates to civilian noninstitutional population)

Sex and age	Total population	With no limitation of mobility	Has trouble getting around home	Needs help in getting around	Confined to the house
BOTH SEXES					
All ages	100.0	96.8	1.3	1.0	0.9
Under 65 years	100.0	98.4	0.8	0.4	0.4
65 years and over	100.0	82.4	5.8	6.7	5.2
MALE					
All ages	100.0	97.1	1.2	0.9	0.8
Under 65 years	100.0	98.3	0.8	0.5	0.4
65 years and over	100.0	83.8	5.4	6.0	4.9
FEMALE					
All ages	100.0	96.6	1.3	1.1	1.0
Under 65 years	100.0	98.4	0.8	0.4	0.4
65 years and over	100.0	81.4	6.1	7.2	5.3

Source: Based on the National Health Interview Survey. U.S. Public Health Service, National Center for Health Statistics, "Limitations of Activity and Mobility Due to Chronic Conditions, United States, 1972," by Charles S. Wilder, Vital and Health Statistics, Series 10, No. 96, November 1974.

Table 6-5. Physician and Dentist Visits per Person, by Sex and by Broad Age Groups: 1970 to 1980

(Relates to the civilian noninstitutional population)

Sex and age of patient	Physician visits							Dentist visits						
	1970	1975	1976	1977	1978	1979	1980	1970	1975	1976	1977	1978	1979	1980
Total	4.6	5.1	4.9	4.8	4.8	4.7	4.8	1.5	1.6	1.6	1.6	1.6	1.7	1.7
Male	4.1	4.3	4.3	4.2	4.0	4.1	4.0	1.4	1.5	1.4	1.5	1.4	1.6	1.5
Female	5.1	5.7	5.6	5.4	5.4	5.4	5.4	1.7	1.7	1.7	1.7	1.7	1.8	1.8
Under 45 years	4.3	6.7	6.5	6.4	6.4	4.3	4.4	1.8	1.9	1.8	1.8	1.6	1.6	1.7
45 to 64 years	5.2	5.6	5.7	5.4	5.3	5.2	5.1	1.5	1.8	1.8	1.8	1.8	1.7	1.8
65 and over	6.3	6.6	6.9	6.5	6.3	6.3	6.4	1.1	1.2	1.2	1.3	1.2	1.4	1.4

Source: U.S. Public Health Service, National Center for Health Statistics, "Current Estimates from the National Health Interview Survey: United States, 1980," by Susan S. Jack, Vital and Health Statistics, Series 10, No. 139, December 1981, and various other issues of Vital and Health Statistics.

Table 6-6. Admission Rates and Average Length of Stay in Short-Term Hospitals, for the Total Population and the Population 65 Years and Over: 1960 to 1979

(Short-term hospitals have an average patient stay of less than 30 days; covers general and special hospitals, excluding psychiatric and tuberculosis hospitals)

Item	1960	1965	1966	1970	1975	1976	1977	1978	1979
Total population:									
Admission rate[1]	128	137	(NA)	140	156	160	160	160	160
Average length of stay (days)[2]	7.4	7.7	(NA)	8.2	7.7	7.7	7.6	7.6	7.6
Population 65 and over:									
Admission rate[1]	(NA)	(NA)	248	299	328	339	346	350	354
Average length of stay (days)[2]	(NA)	(NA)	(NA)	13.0	11.4	11.3	11.1	10.9	10.6

NA Not available.

[1] Number of admissions per 1,000 resident mid-year population.
[2] Number of inpatient days divided by number of admissions.

Source: Adapted, with permission, from Hospital Statistics, published annually by the American Hospital Association (copyright).

Table 6-7. Hospital Utilization Rates for the Population in Broad Age Groups, by Sex: 1980

(Relates to the civilian noninstitutional population and inpatients in short-stay hospitals. Excludes persons who died in the hospital and persons with stays of less than 1 day)

Age and sex	Patients discharged per 1,000 persons	Days of care per 1,000 persons	Average stay (days)
BOTH SEXES			
All ages	139	1,062	7.6
Under 45 years	110	647	5.9
45 to 64 years	166	1,559	9.4
65 years and over	277	2,772	10.0
MALE			
All ages	119	1,043	8.8
Under 45 years	81	578	7.2
45 to 64 years	167	1,796	10.7
65 years and over	307	2,978	9.7
FEMALE			
All ages	158	1,079	6.8
Under 45 years	138	715	5.2
45 to 64 years	164	1,342	8.2
65 years and over	256	2,627	10.3

Source: U.S. Public Health Service, National Center for Health Statistics, "Current Estimates from the National Health Interview Survey: United States, 1980," by Susan S. Jack, Vital and Health Statistics, Series 10, No. 139, December 1981.

Table 6-8. Residents in Nursing and Personal-Care Homes, by Race and by Sex, for the Total Population, and by Sex and Age for Persons 65 Years and Over: 1964 to 1977

(Numbers in thousands)

Race, sex, and age	Number of residents				Percent of total for all categories				Percent of total population in specified category[3]			
	1977[1]	1973-74[2]	1969	1964	1977[1]	1973-74[2]	1969	1964	1977[1]	1973-74[2]	1969	1964
All classes, total	1,303	1,076	815	554	100.0	100.0	100.0	100.0	0.6	0.5	0.4	0.3
White	1,201	1,010	779	(NA)	92.2	93.9	95.6	(NA)	0.6	0.5	0.4	(NA)
Black and other	102	65	37	(NA)	7.8	6.1	4.5	(NA)	0.3	0.2	0.1	(NA)
Male	375	318	252	194	28.8	29.6	30.9	35.0	0.4	0.3	0.3	0.2
Female	928	758	563	360	71.2	70.4	69.1	65.0	0.8	0.7	0.5	0.4
Both sexes	1,303	1,076	815	554	100.0	100.0	100.0	100.0	0.6	0.5	0.4	0.3
Under 65 years	177	114	93	66	13.6	10.6	11.4	11.9	0.1	0.1	0.1	-
65 years and over	1,126	962	722	488	86.4	89.4	88.6	88.1	4.7	4.4	3.7	2.7
65-74 years	211	163	137	104	16.2	15.2	16.8	18.9	1.4	1.2	1.1	0.9
75-84 years	465	385	323	231	35.7	35.8	39.6	41.7	6.4	5.7	5.3	4.3
85 and over	450	413	262	152	34.5	38.4	32.1	27.5	22.6	24.9	20.0	14.6
Male	375	318	252	194	100.0	100.0	100.0	100.0	0.4	0.3	0.3	0.2
Under 65 years	81	52	45	36	21.6	16.4	17.9	18.7	0.1	0.1	0.1	-
65 years and over	294	266	207	158	78.4	83.6	82.1	81.3	3.0	3.0	2.5	2.0
65-74 years	80	65	51	40	21.3	20.5	20.2	20.9	1.3	1.1	0.9	0.8
75-84 years	122	102	91	74	32.5	32.2	36.1	38.2	4.5	4.0	3.7	3.3
85 and over	92	98	64	43	24.5	30.9	25.4	22.2	14.7	17.8	13.9	11.1
Female	928	758	563	360	100.0	100.0	100.0	100.0	0.8	0.7	0.5	0.4
Under 65 years	96	62	48	30	10.3	8.2	8.5	8.3	0.1	0.1	0.1	-
65 years and over	832	696	515	330	89.7	91.8	91.5	91.7	5.9	5.4	4.5	3.2
65-74 years	131	98	86	64	14.1	12.9	15.3	17.8	1.6	1.3	1.2	1.0
75-84 years	343	283	232	157	37.0	37.3	41.2	43.5	7.6	6.8	6.4	5.1
85 and over	358	315	198	109	38.6	41.6	35.2	30.3	26.2	28.5	23.3	16.7

- Represents zero. NA Not available.

[1] Includes domiciliary homes.

[2] Excludes personal care homes without nursing.

[3] Based on the U.S. Bureau of the Census estimates of the resident population.

Source: Data based on periodic surveys. U.S. Public Health Service, National Center for Health Statistics, "Characteristics, Social Contacts, and Activities of Nursing Home Residents, United States: 1973-74, National Nursing Home Survey," Vital and Health Statistics, Series 13, No. 27, 1977; "The National Nursing Home Survey, 1977, Summary for the United States," Vital and Health Statistics, Series 13, No. 43, 1979; other Vital and Health Statistics reports, Series 12 and 13; and unpublished data.

Table 6-9. Per Capita Personal Health-Care Expenditures for Persons 65 Years and Over: Selected Years, 1965 to 1978

(Based on U.S. Bureau of Census data as of January 1 for total U.S. population including Armed Forces and Federal civilian employees abroad, and the civilian population of outlying areas)

Year	Total[1]	Hospital care	Physicians' services	Nursing-home care
PER CAPITA				
1965	$ 472	$176	$ 92	$ 61
1970	854	349	150	205
1976	1,624	703	280	405
1978	2,026	869	366	518
All ages	753	341	158	71
Under 65 years	597	276	133	16
PERCENT INCREASE				
1965-78	329	395	295	748
1965-70	81	99	62	235
1970-78	137	149	144	153

[1] Includes dentists' services, other professional services, drugs and drug sundries, eyeglasses and appliances, and other health services.

Source: Based on table A in Charles F. Fisher, "Differences by Age Groups in Health Care Spending," Health Care Financing Review, Vol. 1, No. 4, pp. 65-90, Spring 1980, U.S. Health Care Financing Administration.

Table 6-10. Percent Distribution of the Population by Selected Personal Habits and Life Style: Various Years, 1975 to 1979

Personal habit or life style	Both sexes					Male, 20 years and over	Female, 20 years and over
	Total, 20 years and over	20 to 44 years	45 to 54 years	55 to 64 and over	65 years and over		
HOURS OF SLEEP, 1977							
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 7 hours	21.7	20.7	23.0	22.8	22.7	23.3	20.4
7 hours	27.9	29.6	31.5	25.4	21.2	29.8	26.4
8 hours	37.8	38.0	36.8	38.6	37.5	35.8	39.5
9 or more hours	12.5	11.5	8.8	13.3	18.6	11.1	13.7
EATS BREAKFAST, 1977							
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Every day	58.1	44.0	61.5	73.1	86.2	57.3	58.7
Sometimes	15.9	21.3	14.1	9.5	5.7	15.8	15.9
Never	26.1	34.7	24.3	17.4	8.0	27.0	25.4
EATS SNACKS, 1977							
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Every day	38.0	42.4	36.6	34.6	28.3	40.1	36.3
Sometimes	27.4	30.9	26.4	22.7	21.1	25.4	28.9
Never	34.7	26.7	37.1	42.7	50.5	34.4	34.8
FREQUENCY OF ALCOHOL CONSUMPTION, 1977							
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Never	28.6	20.6	27.3	36.0	48.6	21.5	34.2
Occasionally	41.9	46.1	40.7	37.7	33.3	35.9	46.7
1 or 2 times a week	15.5	18.8	14.8	12.6	8.2	20.2	11.8
3 or more times a week	14.0	14.4	17.2	13.6	9.9	22.5	7.3
OVERWEIGHT, 1977[1]							
10 to 19.9 percent	20.2	18.1	23.5	22.1	22.2	24.4	16.9
20 percent or more	25.6	20.5	30.9	34.4	29.2	25.7	25.6
PHYSICAL EXERCISE, 1975							
Percent not exercising regularly[2]	51.4	46.3	56.6		57.7	51.5	51.3

	Both sexes				Male, 17 years and over	Female, 17 years and over
	Total, 17 years and over	17 to 44 years	45 to 64 years	65 years and over		
CIGARETTE SMOKING, 1979						
Total[3]	100.0	100.0	100.0	100.0	100.0	100.0
Never smoked	45.7	46.8	37.7	55.9	35.0	55.2
Ever smoked	53.7	52.6	61.5	43.7	64.3	44.3
Former smoker	20.7	16.0	27.0	27.4	27.5	14.7
Present smoker	33.0	36.6	34.5	16.3	36.8	29.6

[1] Desirable weight based on standards prepared by the Metropolitan Life Insurance Company.

[2] Regular exercise is any exercise done on a weekly basis.

[3] Includes persons for whom smoking status is unknown.

Source: U.S. Public Health Service, National Center for Health Statistics, Vital and Health Statistics, Advance Data, No. 64, November 1980; Health, United States, 1976-77, and unpublished data.

Chapter 7.
Social Characteristics

This chapter and the following one are concerned with the principal social and economic characteristics of the older population in the United States. The characteristics covered in the present chapter are marital status and marriage, living arrangements, intergenerational family support, and educational attainment and literacy. In the following chapter we consider labor force participation and retirement, income status and poverty, expenditures and assets, and societal economic dependency, including a discussion of the demographic factors affecting the funding of the Social Security retirement program.

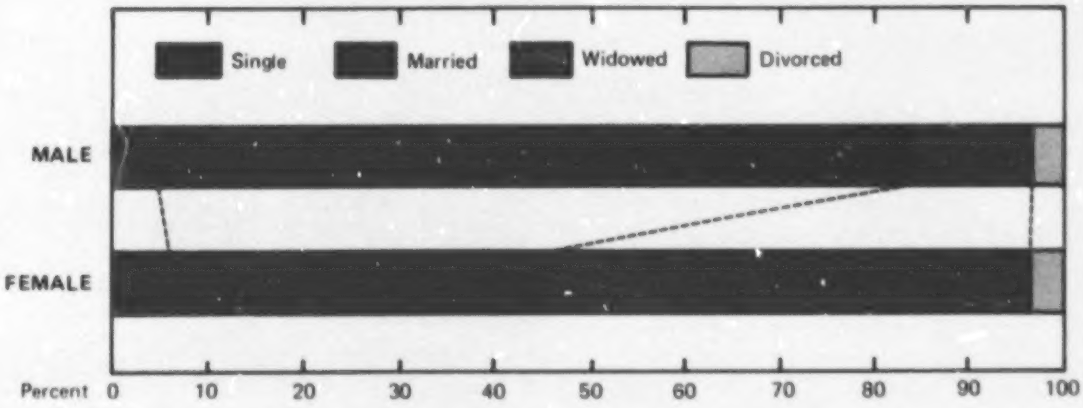
MARITAL STATUS AND MARRIAGE

Age and sex variations. The proportions of married men and women increase sharply between ages 25 and [illegible]0, reaching a peak and plateau at about age 35. The divorce rates for both men and women become substantial by the early thirties, and the proportions of divorced men and women rise sharply through the thirties until they reach a peak at about age 40. The proportion of widows is relatively low up to the mid-forties; after age 45, the proportion of widows increases rapidly and remains high through the rest of the life cycle (table 7-1). The proportion of widowers becomes substantial only after age 65. After age 45, the proportion of married men tends to be much higher than the proportion of married women because of the higher remarriage rate of men following divorce and widowhood, the smaller number of eligible men, and the hihger death rate of married men than married women.

Most men 65 years old and over are married and live with their wives; this marital arrangement described over 3 out of 4 men over age 65 in March 1981 (figure 7-1 and tables 7-1 to 7-3). Few elderly men are widowed or live alone; only 1 out of 8 men 65 years and over was widowed and only 1 in 7 was living alone. Women 65 years old and over are much more likely to be widowed than married and more likely to be living alone than with husbands. In March 1981, over half (51 percent, of the elderly women were widowed, somewhat more than one-third were married and living with a spouse, and nearly two-fifths were living alone.

The distribution of the population according to marital status shifts considerably with increasing age in the age range 55 and over (tables 7-1 and 7-2). The changes are similar in broad pattern for both men and women, but they are more dramatic for women than for men. The proportion of men married with wife present decreases

FIGURE 7-1. **Distribution of the Male and Female Populations 65 Years Old and Over by Marital Status: 1981**



Source: Table 7-1.

gradually with increasing age; for married women with husband present, the decline in the proportion is abrupt. In March 1981, only 1 out of 5 women 75 years old and over was married and living with her husband, as compared with 2 out of 3 at ages 55 to 64 years. About 7 out of 10 men 75 years and over were married and living with their wives; at ages 55 to 64 the corresponding proportion is 5 in 6. The proportions of men and women who are widowed rise sharply with increasing age above age 55 but the male levels are markedly lower than those for females.

Associated with these marital changes are pronounced increases with rising age in the proportions of women living alone or with someone other than their spouse. Nearly one 1 of 2 women (45 percent) 75 years old and over lived alone in 1981, as compared with 1 out of 5 (18 percent) women 55 to 64 years old (table 7-3). One out of five men 75 years and over lived alone; at ages 55 to 64, only 1 in 11 lived alone.

For the period from 1960 to 1981 taken as a whole, the net changes in marital distribution were substantial for elderly men but slight or small for elderly women (table 7-2). The proportion of men who were married increased greatly, and the proportion of men who were widowed declined greatly. The proportion of men 65 years and over married and living with their wives rose from 70 percent in 1960 to 77 percent in 1981, while the proportion of men widowed fell from 19 percent to 13 percent. For women 65 years and over, there were small or negligible net changes in the proportion single, the proportion married and living with their husbands, and the proportion widowed. Most of the change in the marital distribution of elderly men or women during the 1960-81 period occurred during the 1970's; little change occurred in the 1960's.

Analysis of differences between the sexes. Several factors are responsible for the higher proportion of widows among older women. The major factor is the much higher mortality of married men as compared with the mortality of married women. This difference is a joint result of the fact that the death rates of married men are higher than those of married women at the same ages and the fact that husbands are typically a few years older than their wives. The median ages at marriage, for women 55 years of age and over marrying in 1976, differed by about 3 1/2 to 4 years from those of their male marriage partners.[94] The median difference between the ages of husbands and wives for husbands 55 to 59 and 60 to 64 years of age in 1979 was 3 to 3 1/2 years.[95] An indication of the differences in the death rates of married men and their wives at the older ages may be secured by comparing the death rates for married females at various older ages with those for married males at the next higher 5-year age group, for 1959-61, the latest period for which such figures are available. The comparison is shown in table 7-4. Death rates for husbands run two to three times greater than those for wives.

Another factor accounting for the higher proportion of widows than widowers is the higher remarriage rate of widowers. In 1978, the remarriage rate (remarriages per 1,000 widowed and divorced persons) was 15.6 for widowers 65 years old and over and 1.8 for widows 65 years and over.[96] The remarriage rate in 1978 was 64.9 for widowers 45 to 64 years of age and 13.6 for widows 45 to 64 years of age. The vast majority of marriages at these ages are marriages of widowed persons. These figures indicate also the relative infrequency of marriage of older persons, particularly women. The higher remarriage rates of elderly widowers than of elderly widows is a result of social norms that encourage marriage of elderly men to younger women, particularly women under age 65 (and discourages the opposite), a stronger motivation for men to remarry, and the relatively small pool of unmarried older men combined with the relatively large pool of unmarried older women from which a partner can be selected.[97] The male demographic advantage in the marriage market is considerable. In 1981, the proportion of unmarried women 65 years old and over was three times as great as the proportion of unmarried men 65 years and over, and unmarried women at these ages outnumbered unmarried men by over 3 1/2 to 1 (tables 7-1 to 7-3).

As a result of the differences in the death rates of married men and their wives, most married women outlive their husbands by many years. At current death rates in the United States, women who become widowed at age 65 outlive their husbands, on the average, by about 18 years, and men who become widowed at age 70 outlive their wives by about 11 years.[98] However, married women at age 65 are likely to outlive their husbands at age 70 by about 9 years on the average (without specification of a particular age at death of the husband or wife or the sex of the first decedent).[99] The surviving partner, if female, is also highly likely to remain in the widowed state because of the very low remarriage rate of widows. (See also discussion of "family life cycle.")

---

[94] U.S. Public Health Service, National Center for Health Statistics, *Vital Statistics of the United States, 1976*, Vol. III, *Marriage and Divorce*, 1980, table 1-7.

[95] U.S. Bureau of the Census, *Household and Family Characteristics: March 1979*, Current Population Reports, Series P-20, No. 352.

[96] U.S. Public Health Service, National Center for Health Statistics, *Monthly Vital Statistics Report*, Advance Report, *Final Marriage Statistics, 1978*, Vol. 29, No. 6, Supplement (1), September 1980.

[97] See also Judith, Treas, and Anke Van Hilst, "Marriage and Remarriage Rates Among Older Americans," *Gerontologist*, Vol. 16, No. 2, April 1976, pp. 132-136.

[98] Approximated by the expectation of life of females at age 65, adjusted for the difference between the mortality level of widowed women and all women, and by the expectation of life of males at age 70, adjusted for the difference between the mortality level of widowed men and all men.

[99] Approximated by the difference between the expectation of life of females at age 65 and the expectation of life of males at age 70, adjusted for the difference between the mortality level of married persons and all persons and the shift from married status to widowhood. See also Robert J. Myers, "Statistical Measures in the Marital Life Cycles of Men and Women," *International Population Conference, Vienna, 1959*, International Union for the Scientific Study of Population, Liège, 1959, pp. 229-233.

LIVING ARRANGEMENTS

Family and nonfamily households. A large percentage of elderly women do not live in families; that is, they live with nonrelatives or alone. About 80 percent of the men and 53 percent of the women 65 years old and over were members of families in 1981 (table 7-5). Most men are husbands in married-couple families; i.e., they live in households maintained by themselves and their wives (70 percent). A small proportion are other male householders, i.e.; they live in households maintained by themselves only, without a spouse (3 percent). Only a minority of the women, however, are wives in married-couple families (34 percent) or are other female householders (8 percent). (See figure 7-2.)

The distribution of the elderly according to family status has shown some minor and some major shifts during recent years. Between 1965 and 1981, the proportion of women living in families has fallen sharply (from 63 percent to 53 percent), while the proportion of men living in families has remained essentially unchanged (80 percent). The decrease of women in families in this period resulted largely from the decrease in "other relatives" (i.e., women in families other than "married-couple" wives or other females maintaining households). The proportion of other female householders also declined. The proportion of women who were other relatives in families decreased from 19 percent in 1965 to 10 percent in 1981, and the proportion of other female householders declined from nearly 11 percent to about 8 percent (table 7-5). For men there was a decrease in other relatives which was largely offset by a rise in members of married couples. The proportion of men 65 years old and over who were other relatives in families dropped from 9 percent in 1965 to 4 percent in 1981, while the proportion of male cohouseholders rose from 67 percent in 1965 to 70 percent in 1981.

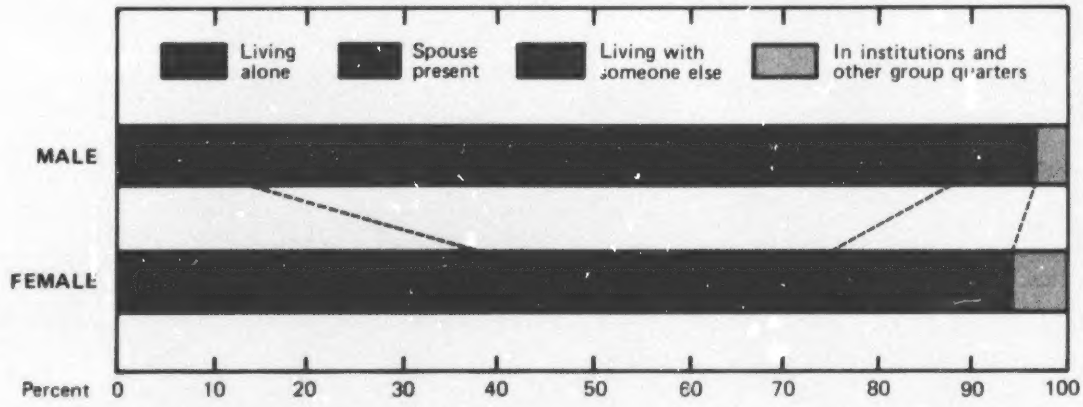
In the last few decades, there has been an increase in the proportion of elderly individuals, especially women, who maintain their own households, living either alone or with nonrelatives.[100] Such "primary" individuals represented 15 percent of the men 65 years old and over and 40 percent of the women 65 years old and over in 1981; in 1965, the figures were 14 and 31 precent, respectively. Among elderly persons living in nonfamily households, the proportion of females was 3 1/2 times as high as the proportion of males. This fact is explained by the much larger proportion of elderly widows than widowers and the greater tendency on the part of the widows than widowers to live independently instead of with their children or other relatives.

In 1981, over half (54 percent) of the households maintained by persons 65 years and over constituted family households (table 7-6). Most family households consisted of married-couple families. A considerably smaller proportion of households were maintained by other female householders with no husband present (7.3 percent) or other male householders with no wife present (1.8 percent).

---

[100] See Frances E. Kobrin, "The Fall of Household Size and the Rise of the Primary Individual in the United States", *Demography*, Vol. 13, No. 1, February 1976, pp. 127-138.

FIGURE 7-2. **Distribution of the Male and Female Populations 65 Years Old and Over by Living Arrangements: 1981**



Source: Table 7-3.

Prospects. Whether the trends described will continue in the future will depend on the stability or change in attitudes regarding marriage, divorce, and living together; the prospects for reducing mortality in later life; and the prospects for the convergence of male and female death rates. Although styles of family life are changing and are affecting the living arrangements of older persons, irregular living arrangements now characterize only a small proportion of the elderly population, and they are expected to continue to do so.

According to the latest Census Bureau projections of households and marital composition, little change will occur in the proportion of elderly persons who are single between 1981 and 1995 (table 7-2).[101] The proportions of elderly men and women who are married and living with spouses are expected to drop slightly, while the proportions of other ever-married elderly men and women are expected to rise slightly. Greater-than-average increases in the numbers of divorced men and women will be balanced by smaller-than-average increases in the numbers of widows and widowers.

The proportion of households maintained by married couples in which the householder (nearly always the husband) is 65 years old and over will change little between 1981 and 1995 (45 percent in 1981 and 44 percent in 1995), as will the proportion of households in which the householder is an elderly male living alone or with nonrelatives (9.1 percent in 1981 and 9.9 percent in 1995. (See table 7-6.) However, the proportion of households in which the householder is an elderly female living alone or with nonrelatives will show a substantial increase from 1981 to 1995 (37 percent and 41 percent, respectively). Similar increases will occur both with young-old and old-old female householders. In 1995, half of the households with female householders over 75 years of age will be maintained by women living alone or with nonrelatives.

Institutional population. Contrary to popular belief, only a small proportion of the elderly population lives in institutions. In 1981, the estimated proportion of the population 65 years and over residing in institutions was 5.2 percent (table 7-5). The proportion in institutions has been moving steadily upward. The corresponding figure was 4.0 percent in 1965. The principal factor in the increase in the proportion in institutions has been the aging of the elderly population (i.e., the increase in the proportion of aged persons among the elderly) in association with the fact that the proportion institutionalized rises with advancing age. Only the proportion in institutions at ages 75 and over increased between 1965 and 1981. According to 1980 census data, the proportion of institutional residents is at a minimum among adults at about ages 45 to 54 for males (0.7 percent) and at ages 20 to 44 for females (0.3 percent) and then rises steadily with increasing age. For example, the figures were 3.9 percent and 5.6 percent, respectively, for males and females aged 75 to 79, and 16 and 27 percent, respectively, for males and females aged 85 and over. Nearly one-third of the males and over three-quarters of the females in institutions are 65 years or over.

A much larger proportion of the elderly population than 5 percent will spend some part of its lifetime in an institution.[102] Persons aged 65 may be expected to spend about 1 year on the average in an institution during their remaining lifetime; the period is longer for persons aged 65 who are currently residing in an institution. Values for the proportion of the elderly population that will spend some time in an institution and the average time spent by institutionalized persons in institutions have not been precisely ascertained.

In 1976, over one million persons 65 years old and over, resided in institutions. Most of these, 96 percent, lived in nursing homes. Prior to 1970, most of the elderly institutional population lived in homes for the aged and mental hospitals. Some of the demographic characteristics of the population in institutions can be ascertained from the 1976 Survey of Institutionalized Persons.[103] About 9 out of 10 institutionalized persons 65 years and over have relatives; this percentage does not vary much from that for younger residents but is much lower than that for the general population. The median age of residents is quite high, 80 years. The proportion of the female population 65 years and over that is institutionalized is more than twice as large as the corresponding proportion of the male population, and the ratio of institutionalized women to institutionalized men is well over 2 to 1. Nearly 2 out of 3 elderly residents are widowed. The excess of the proportion of elderly females in the institutionalized population over their proportion in the general elderly population results principally from the greater tendency of women than men to live alone or in households without relatives (usually as widows), their poorer economic status, and their higher average age, which is associated with greater illness and disability.

Family life cycle. The term family life cycle, or marital life cycle, relates to the sequence of critical stages through which a family or the members of a married couple pass in the years following the formation of the family. The concept is used as a framework for the study of changes over time in the composition and demographic characteristics of the family and for cohort analysis of the family. The typical life-cycle stages are measured in terms of the mean or median ages at which the critical events occur; these events include age at first marriage, age at birth of first child, age at which last child leaves home, age at birth of first grandchild, age at dissolution of marriage through the death of the husband or wife, or through divorce, and age at death. Other measures are the duration of first marriage, duration of widowhood, and duration of divorce.

---

[101] U.S. Bureau of the Census, *Projections of the Number of Households and Families: 1979 to 1995*, Current Population Reports, Series P-25, No. 805, 1979. See also Paul C. Glick, "The Future Marital Status and Living Arrangements of the Elderly," *Gerontologist*, Vol. 19, No. 3, June 1979, pp. 1979, 301-309, esp. p. 307.

[102] Robert Kestenbaum, "The 4-Percent Fallacy: A Methodological and Empirical Critique of Extended Care Facility Population Statistics," *International Journal of Aging and Human Development*, Vol. 4, pp. 15-21, 1973.

[103] U.S. Bureau of the Census, *1976 Survey of Institutionalized Persons*, *Current Population Reports*, P-23, No. 69, August 1978.

Drawing on a study by Spanier and Glick, table 7-7 illustrates the early segments of the family life cycle with ages for selected life cycle events experienced by several birth cohorts of ever-married mothers and of ever-married White mothers who have married once and who have completed high school (but not beyond), as of 1975. The table shows changes in the timing of several critical events for five cohorts born from 1900-09 to 1940-49. The two younger cohorts of ever-married mothers married at substantially younger ages than the two older cohorts. The mean age at marriage of the 1940-49 cohort, 20.2 years, was 1.5 years lower than that of the cohort of 1900-09. The interval between marriage and motherhood also declined; this interval dropped from 2.5 years for the oldest cohort to 1.6 years for the youngest cohort.

As a result of the changes from the oldest to the youngest cohorts in age at marriage and age at motherhood (totalling 2.4 years) and the change in the interval between the mean ages at the first and last births (3.0 years), the average age of completing childbearing fell markedly, from 30.8 years for the 1900-09 cohort to only 25.4 years for the 1940-49 cohort. These cohorts completed their childbearing in very different historical periods, the oldest cohorts completing fertility in the Depression years and the youngest completing fertility in the 1970's. They not only completed their childbearing at very different ages but had somewhat different levels of completed fertility. Assuming that the mean age of departure from home by the last child had not perceptibly changed between the 1950's and the 1980's, the ages of the women when the last child left home differed also by about 5 1/2 years. Members of the youngest cohort would be only about 44 years of age on the average when the last child left home as compared with 49 years for the oldest cohort. The difference is probably greater because the mean age of departure of the last child from home has apparently fallen.

Measures of the later segments of the family life cycles of men and women for cohorts born from 1908-12 to 1938-42 and for the year 1975, developed by Schoen and his associates, are shown in table 7-8. These measures recognize the fact that many marriages terminate through divorce and that some wives predecease their husbands, but do not take account of remarriage. The proportion of first marriages ending in widowhood or death for both men and women steadily declined for these cohorts over time, and the proportion ending in divorce sharply rose. For example, the proportion of marriages of women ending in widowhood dropped from 53 percent for the 1908-12 cohort to 45 percent for the 1939-42 cohort; these figures correspond approximately to the proportions of marriages of men ending in death. The mean ages at which women became widowed or divorced changed little for the various cohorts, being approximately 65 to 66 years and 36 to 37 years, respectively, and rising and falling slightly. Women experienced 14 1/3 years of widowed life or 9 to 10 years of divorced life.

According to the Schoen calculations, the much smaller proportions of husbands who outlived their wives became widowed at ages 65 to 68 or divorced at ages 39 to 41, figures which run a little higher then those for women. There is a substantial rise in the age of widowhood and a substantial fall in the age of divorce. The men experienced, on the average, 6 1/2 years of widowhood or 4 to 4 1/2 years of divorced life. Similar (period) calculations for 1975 resemble the pattern of the cohort data for both men and women.

INTERGENERATIONAL FAMILY SUPPORT

Measures of the relative size of the elderly population (or some segment of it) and the productive-age population (or some segment of it), or of the relative size of the population in two "generations," are useful in evaluating the "burden" of social, psychological, and economic support of the elderly population on younger age groups in the population. An assumption usually made in the use of these measures is that the older segment of the population is an economic burden on the younger segment and must be economically supported by it. A possible ethical inference is that each generation has an obligation to support the previous generation. Questions of the feasibility of providing the economic support and of intergenerational equity arise in evaluating the various measures of intergenerational support.

It is useful to consider the question of social and economic support for the elderly in two components: support by the family network, particularly adult children, and support by the society or community. From a demographic view, the first is analyzed in terms of the relative number of children, grandchildren, siblings, or other kin, and their older parents, grandparents, or other relatives; and the second is analyzed in terms of the relative size of the elderly population and the population of working age, or of older nonworkers and workers. Currently, the family network functions largely in social and psychological support of the elderly, and the community functions largely in economic support. Accordingly, measures of family support are considered in this chapter, and measures of societal dependency are considered in the next one.

The number of living "generations" in "families" (related persons whether living in the same or different housing unit) has been undergoing a gradual change in the past several decades.[104] In general, families of today have more generations (between three and four generations) than families earlier in this century (between two and three), and this trend is expected to continue. By the year 2000, the typical family is expected to be a four-generation family. The number of generations depends primarily on four factors: (1) the rate of survival from birth to later ages, (2) the level of marriage and remarriage rates, (3) the proportion of married women who are fertile, and (4) the mean age at birth of first child. Considering the first several decades of this century, generally we have seen a rise in life expectancy, rises in marriage rates, a decline in the proportion of married women who are childless, and a decline in the mean age at birth of first child. In comparison with these earlier trends, we are now experiencing a continuation of the increase in longevity, somewhat reduced marriage and remarriage rates, higher proportions of childless women, and a rise in the mean age at birth of first child.

---

[104] No operational procedure for measuring the "average number of living generations in a family" has been developed. Available census and survey data do not provide information on children or other relatives not living in the same household. Theoretically, we would measure the average number of generations (one or more relatives in a parent-child relationship whether or not living together) per family by relating the total number of generations over all families to the number of lineally related family groups.

None of the four factors affecting the number of generations in a family is easily predictable. The only one whose trend does not tend to be cyclical or wave-like is the level of mortality rates. Changes in the other three factors are less predictable since they depend largely on social and economic changes, including changes in attitudes, fads, and fashions, which are impossible to anticipate. We expect, nevertheless, that the "average number of generations per family" will continue to rise even if marriage rates, fertility rates, and timing of first births are less favorable because of steadily declining mortality affecting every age and, hence, every generation.

It is expected also, however, that in the future, elderly persons will have fewer living lineal descendants than old people in the past, in spite of generally greater longevity. The general decline in fertility has tended to reduce the size of the familial support system,[105] and a continuation of low fertility will contribute to reducing the support system even further, possibly to a low point about 2025, when the number of elderly persons is at a new peak. It is also likely that elderly persons will have a smaller number of living relatives, including brothers and sisters as well as children and grandchildren.

It is estimated on the basis of 1970 census data that about 78 percent of women 65 years old and over have at least one living child. The corresponding figures for White women and Black women are 80 percent and 70 percent, respectively. (See appendix D for the basis of these estimates.) The part of the kinship network of the elderly consisting only of living children is expected to decline and stabilize at a low level in the long run. It appears that a larger proportion of the elderly will have a living child in the year 2000 than in 1981, but in 2025, the contrary situation will prevail. The trend in the proportion of elderly women having at least one living child will depend on whether prospective increases in survival rates of the children can offset past and prospective reductions in fertility and increases in survival rates of the parents. This is not expected to occur. The 1965-81 period has seen a sharp reduction in mortality at all ages, including particularly the older ages, accompanied by a steady decline in fertility rates and their leveling off at low levels. We expect fertility to remain low,[106] and we do not expect the pace of recent mortality declines at the older ages to be maintained.

Familial dependency ratios for the aged represent the relative number of aged dependents, defined as the population in a specified group of older ages at a given date, and the population in a specified younger age group at the same date corresponding approximately to the children of the former. These measures are somewhat analogous to the fertility measure known as the general fertility ratio. They may, in fact, be viewed as types of inverted "superannuated" general fertility ratios. Instead of relating young children to women in the childbearing ages, these measures relate elderly "parents" to middle-aged "children" or aged "parents" to elderly "children." Dependency may be examined more analytically in terms of measures of actual economic, social, and psychological support of the older "generation" by their children, grandchildren, and siblings, but satisfactory measures of this kind are not available and are difficult to construct. Ratios relating persons 65 to 79 years of age to persons 45 to 49 years of age (characteristic ages of children of elderly parents), and ratios relating persons 80 years and over to persons 60 to 64, or persons 85 years and over to persons 65 to 69, can be used to illustrate two types of intergenerational familial age-dependency ratios.

The ratio of persons 65 to 79 years of age to persons 45 to 49 years of age is expected to rise moderately in the next few years (1981 to 1985) from its 1981 level of 182 (per 100) and then fall steeply as the large birth cohorts of the postwar period reach ages 45 to 49 (table 7-9). The ratio of elderly parents to their children measured in this way will reach a trough around 2005, when the 1955-60 birth cohorts reach ages 45 to 49. The decline in birth rates and in numbers of births which has occurred in the last few decades and the entry of the baby-boom cohorts into the ranks of old age will produce a sharp rise in the ratio after 2010, when ages 45 to 49 and ages 65 to 79 begin to be affected by these two trends. The ratio will tend to remain high throughout the next several decades, particularly if fertility rates continue to remain low. A peak of 192 persons 65 to 79 years per 100 persons 45 to

---

[105] Judith Treas, "Family Support Systems for the Aged: Some Social and Demographic Considerations," *Gerontologist*, Vol. 17, No. 6, 1977, pp. 486-491.

[106] See discussion in chapter 2. See also Judith Treas, "The Great American Fertility Debate: Generational Balance and Support of the Aged," *Gerontologist*, Vol. 21, No. 1, 1981, pp. 98-103; Charles F. Westoff, "Some Speculations on the Future of Marriage and Fertility," *Family Planning Perspectives*, Vol. 10, No. 2, pp. 79-83, March/April 1978; and Deirdre Wulf, "Low Fertility in Europe: A Report from the 1981 IUSSP Meeting," *International Family Planning Perspectives*, Vol. 8, No. 2, pp. 63-69, June 1982.

49 years will be reached in 1985, and another peak of about 252 will probably be reached in 2025.[107]

Many persons aged 45 to 49 will have the joint tasks of supporting both an aged parent or parents, often over 70 years of age, and children of college age in their early twenties. This problem is now, and will be, a continuing one for the "middle" generation, but the burden will be especially great in the years of the next century when the baby boom cohorts largely comprise the members of the elderly age classes. The pattern of high parent-child ratios will continue if fertility remains low and especially if the population becomes stationary.

Changes in the mortality level up to middle age (e.g., birth to 45 to 49 years) have become of small importance in determining the level and trend in the ratio of elderly parents to their children. Before 1950 and especially before the Second World War, infant and child mortality played an important secondary role in determining the number of surviving middle-age children, but fertility changes now almost exclusively determine this number (table 7-10). Survival of mothers to old age (e.g., 17.5-32.5 years to 65.0-80.0 years) is still below 75 percent although it has been steadily and rapidly rising. Over much of the period since 1930, the relative survival of mothers to old age and of their children to middle age has been below 0.75, but the relatively greater improvement in the survival of mothers has been contributing and will contribute to a rise in the relative number of elderly parents and adult children. The recent sharp decline in the mortality of the elderly is intensifying the effect of low and declining fertility in raising the ratio of elderly parents to their adult children.

Since fertility trends, and age patterns of mortality and trends in these patterns, vary for different race and ethnic groups, the role of fertility and mortality in the numerical balance of elderly parents and adult children will vary from one group to another. Moreover, immigration may have an important effect on the balance among some groups, such as Hispanics, which have experienced a large volume of immigration in recent years.

Many persons of extreme old age "depend upon" children who are themselves elderly. The ratio of persons 80 years and over to persons 60 to 64 years, or of persons 85 years and over to persons 65 to 69 years, may be used to represent the "burden" on young-old "children" of supporting their extreme-aged parents. The past trend in the ratio of extreme-aged parents to their elderly children has been roughly similar to that of the ratio of elderly and aged parents (65 to 79 years) to their middle-aged children (45 to 49 years), with an appropriate time lag (table 7-11). The figures increased greatly in recent decades (1950 to 1980), after only modest increases in the earlier decades of this century. There were 21 and 29 persons 80 years or over for every 100 persons 60 to 64 years in 1930 and 1950, respectively, but by 1981 the ratio had nearly doubled to 53. The series is expected to move steadily upward in the next few decades, reaching a peak of 96 in the year 2000, as the increasingly larger birth cohorts of 1900-21 reach extreme old age. After a steady decline to 65 in 2020, the ratio will turn around and leap forward as the baby-boom cohorts begin to arrive at these ages.

Regardless of the level of the old/old-to-young/old ratio, the possible financial and psychic burden on the individual families may be tremendous if there are two generations of elderly people. Moreover, the financial burden may be so great that it may fall wholly or largely on the community; the children of the young-old generation may be incapable of carrying it to any extent.

EDUCATIONAL ATTAINMENT

Age, sex, and race variations. Educational attainment measured in terms of median years of school completed or the percent of high school graduates, observed for any particular year, is much lower for older persons than for younger adults. In 1981, the percentage of the population 65 years old and over that had graduated from high school was only three-fifths as great as the percentage of the population 25 years old and over that had graduated from high school (table 7-12). The relative difference was about the same for men and women.

As of 1981, 43 percent of elderly men and 40 percent of elderly women had discontinued their formal schooling at the eighth grade. One in two elderly men or women had completed 1 or more years of high school, 2 out of 5 were high school graduates, and 1 in 5 had completed 1 or more years of college. This is in sharp contrast to the record of the adult population in general. Eighteen percent of men 25 years old and over and 17 percent of women 25 years old and over had completed only eight grades. Nearly three-quarters of the men 25 years old and over had completed 1 or more years of high school, and two-fifths had completed 1 or more years of college. Among women 25 years old and over, more than three-quarters had 1 or more years of high school education, and about one-third had some college education. Seven out of ten men or women were high school graduates.

While educational attainment declines with increasing age in any year, such an inverse relationship cannot apply to an actual birth cohort since educational attainment is cumulative and would rise for an actual cohort.[108] The inverse relationship between age and educational attainment in 1981 reflects the cumulative experience of many different cohorts observed in the same year. Alternatively, it reflects the increasing educational opportunities available to each new cohort and the increasing aspiration for and completion of additional years of schooling on the part of the new cohorts. These factors have been associated with the rising socioeconomic status of the U.S. population and the concomitant intergenerational influences. Another, albeit secondary, factor has been the special history of immigration to the United States. The large influx of immigrants to the United States in the late years of the 19th century and the early years of the 20th century, and the sharp curtailment of immigration following World War I, have resulted in a relatively larger proportion of foreign-born persons among the elderly population (12 percent) than among the middle-aged population (6 percent). (See table 3-5.) The elderly foreign-born population has a somewhat lower educational level than the elderly native population.

---

[107] A similar trend to 2000 is shown by projections of the relative numbers of surviving children and parents prepared by McFarland that assume stable mortality rates after 1975. According to these projections, women 65 and over and women 75 and over in 2000 will have more living children than the women 65 and over and 75 and over, respectively, in 1975. (Reductions in mortality rates would result in only a small diminution of the proportion with surviving children.) See David D. McFarland, "The Aged in the 21st Century: A Demographer's View," in Lissy Jarvik (ed.), *Aging into the 21st Century*, Gardner Press, Inc., New York, 1978.

[108] A decline might occur at the older ages through the effect of immigration or an inverse correlation between educational attainment and survival probabilities. The former factor would contribute to only a small or minor decline and the evidence contradicts an inverse relation between educational level and survival level.

There is a marked disparity between the educational attainment of elderly Whites and elderly Blacks. Forty-two percent of elderly White men, as compared with 62 percent of elderly Black men, discontinued their schooling at the eighth grade. Similarly, 39 percent of elderly White women, as compared with 59 percent of elderly Black women, did not go beyond the eighth grade. About 50 percent more elderly White men than elderly Black men completed 1 or more years of high school (59 percent vs. 38 percent); similarly, the proportion of elderly White women with some high school education was much higher than that for elderly Black women. The principal underlying factors in the lower educational attainment of Blacks are believed to be their relatively depressed economic status, past social and economic discrimination, and residential clustering in racial and economic-status enclaves. Under such circumstances the consequences appear to have been reduced motivation in learning, more limited occupational goals, and a poorer quality of education.

Trends and prospects. The situation with regard to the educational attainment of the population has changed considerably in the last two decades. The level of educational attainment of every age segment in the population has been increasing rapidly, as younger, better educated persons move into the adult ages or up within the older ages. The proportion of persons 65 years old and over who have completed high school was 28 percent in 1970 and 42 percent in 1981. It is expected to pass 50 percent sometime between 1985 and 1990 and to approximate 60 percent about 1997 (table 7-12).

Because of the slower increase in the educational attainment of persons below age 65, the relative gap between the educational attainment of the population 65 years and over and the population 25 years and over has been falling and will continue to fall. By the year 2000, the proportion of high school graduates at ages 65 and over (64 percent) will be only one-fifth below the proportion for the entire adult population (80 percent). The deficit in educational attainment was slightly smaller for elderly women than elderly men in 1981 and is expected to remain so until at least the year 2000. Various indices show that the wide gap in the educational level of elderly Whites and Blacks has been narrowing; they suggest that the gap will continue to narrow in the future.

The older population is rapidly becoming a moderately well-educated group that can articulate its interests and participate effectively in the deliberations on the public issues of the day. The current passing from the scene of the pre-World War I immigrants and the prospective arrival in the older ages of the beneficiaries of the post-World War II thrust toward complete equality in educational opportunity will hasten the process of raising the educational level of our older population. The older population's record on voting participation is already among the highest of any age group. The elderly are increasingly becoming a self-conscious political interest group, and they may begin voting as a bloc on various public issues, although this has not been the case in the past.

LITERACY

Although there has been a relatively large increase in educational attainment among elderly persons in the last two decades, in 1979 there was still a small number of elderly persons who were not able to read and write. Illiteracy appears to be greater among the elderly than among younger persons, even though illiteracy is quite low at all ages. Among the elderly, nearly 2 percent reported an inability to read and write, whereas among all persons 14 years old and over, only about half a percent reported this inability (table 7-13).

The extent of illiteracy appears to vary among the elderly of different nativity-parentage groups, with natives of foreign or mixed parentage reporting very little illiteracy (0.6 percent) and the foreign born reporting a moderate amount (4.1 percent). The Black elderly show a substantially greater degree of illiteracy (6.8 percent) than the White elderly (1.1 percent). The literacy status of Blacks is destined to improve rapidly as the younger more literate cohorts move into the older age brackets.

Greater illiteracy poses special difficulties for the elderly in securing necessary services, but this problem is not a serious one in terms of numbers involved or prospects for improvement. To take full advantage of available services requires far more than mere literacy, however. We have noted the rapid increase in the proportion of the elderly who are high school graduates.

Table 7-1. Distribution of the Population 15 Years and Over by Marital Status, by Broad Age Groups and Sex: 1981

(Relates to the noninstitutional population, excluding members of the Armed Forces in military barracks and similar quarters)

Marital status	Total, 15 years and over	15 to 24 years	25 to 44 years	45 to 54 years	55 to 64 years	65 to 74 years	75 years and over	65 years and over
Both sexes	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	25.8	77.4	15.1	4.9	4.6	5.2	5.2	5.2
Married	60.6	21.0	74.8	82.3	77.0	64.3	41.2	55.8
Spouse present	57.3	19.2	70.1	78.4	73.9	62.3	39.5	53.8
Spouse absent	3.3	1.8	4.6	3.8	3.1	2.0	1.7	1.9
Widowed	7.3	0.1	0.6	4.2	11.7	26.3	51.2	35.5
Divorced	6.2	1.5	9.3	8.7	6.6	4.2	2.4	3.5
Male	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	29.4	83.6	18.5	5.1	5.1	4.9	3.5	4.5
Married	62.9	15.5	73.4	86.2	84.7	83.0	72.0	79.3
Spouse present	60.2	14.2	69.8	82.9	81.7	80.6	69.7	77.0
Spouse absent	2.8	1.2	3.6	3.3	3.1	2.4	2.2	2.3
Widowed	2.3	-	0.3	1.4	4.0	8.2	22.1	12.8
Divorced	5.3	1.0	7.8	7.3	6.1	3.9	2.5	3.4
Female	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	22.5	71.3	11.9	4.7	4.2	5.4	6.2	5.7
Married	58.5	26.4	76.1	78.6	70.3	50.1	23.3	39.4
Spouse present	54.8	24.2	70.5	74.3	67.1	48.3	21.8	37.8
Spouse absent	3.7	2.3	5.6	4.3	3.2	1.8	1.5	1.6
Widowed	11.9	0.1	1.3	6.8	18.4	40.1	68.2	51.3
Divorced	7.1	2.1	10.8	9.9	7.1	4.4	2.3	3.6

Source: U.S. Bureau of the Census, Marital Status and Living Arrangements: March 1981, Current Population Reports, Series P-20, No. 372, June 1982.

Table 7-2. Distribution of the Population 55 Years and Over by Marital Status, by Age and Sex: 1960 to 1995

(Total resident population excluding members of the Armed Forces in military barracks, 1950 to 1970; noninstitutional population excluding members of the Armed Forces in military barracks, 1975 to 1995. Figures are for March of year indicated)

Marital status and year	Male				Female			
	55 to 64 years	65 to 74 years	75 years and over	65 years and over	55 to 64 years	65 to 74 years	75 years and over	65 years and over
1960								
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	7.9	6.7	7.8	7.1	6.5	8.4	8.6	8.5
Married	82.4	78.9	59.1	72.4	65.8	45.6	21.8	37.1
Spouse present	79.0	76.2	56.5	69.8	62.9	43.5	20.6	35.3
Spouse absent	3.4	2.7	2.6	2.6	2.9	2.1	1.2	1.8
Widowed	6.2	12.7	31.6	18.8	24.5	44.4	68.3	52.9
Divorced	3.5	1.7	1.5	1.6	3.2	1.7	1.2	1.5
1965								
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	8.4	6.1	7.6	6.6	7.8	7.5	8.0	7.7
Married	83.8	78.9	57.1	71.3	66.8	45.7	20.2	36.0
Spouse present	80.3	75.3	54.0	67.9	63.8	43.3	19.0	34.1
Spouse absent	3.5	3.6	3.1	3.4	3.0	2.3	1.2	1.9
Widowed	4.4	11.8	34.0	19.5	21.6	44.4	70.6	54.4
Divorced	3.5	3.3	1.3	2.6	3.8	2.4	1.2	1.9
1970								
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	7.8	8.0	6.6	7.5	6.8	7.8	7.5	7.7
Married	85.2	78.0	64.3	73.1	67.4	45.2	21.0	35.6
Spouse present	82.3	75.2	60.4	69.9	63.8	43.5	19.1	33.9
Spouse absent	2.9	2.8	3.9	3.2	3.6	1.6	1.9	1.7
Widowed	4.1	11.3	27.7	17.1	21.2	44.0	70.3	54.4
Divorced	3.0	2.7	1.4	2.3	4.6	3.0	1.3	2.3
1975								
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	6.5	4.3	5.5	4.7	5.1	5.8	5.8	5.8
Married	85.0	83.8	70.0	79.3	69.3	49.1	23.4	39.1
Spouse present	81.8	81.8	68.2	77.3	66.7	47.3	22.3	37.6
Spouse absent	3.2	2.0	1.8	2.0	2.6	1.8	1.1	1.5
Widowed	4.0	8.8	23.3	13.6	20.3	41.9	69.4	52.5
Divorced	4.5	3.1	1.2	2.5	5.3	3.3	1.5	2.6
1981								
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	5.1	4.9	3.5	4.5	4.2	5.4	6.2	5.7
Married	84.7	83.0	72.0	79.3	70.3	50.1	23.3	39.4
Spouse present	81.7	80.6	69.7	77.0	67.1	48.3	21.8	37.8
Spouse absent	3.1	2.4	2.2	2.3	3.2	1.8	1.5	1.6
Widowed	4.0	8.2	22.1	12.8	18.4	40.1	68.2	51.3
Divorced	6.1	3.9	2.5	3.4	7.1	4.4	2.3	3.6
1990[1]								
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	4.8	5.6	5.0	5.4	3.6	5.7	5.7	5.7
Range	4.4-5.6	5.4-6.1	4.7-5.6	5.1-5.9	3.1-4.6	5.4-6.5	5.4-6.4	5.4-6.4
Married, spouse present	81.5	77.8	68.6	74.6	70.3	47.7	20.0	35.7
Range	81.5-81.3	78.5-76.4	70.6-64.7	75.7-72.3	71.3-68.3	48.5-46.3	20.3-19.5	36.2-34.6
Other ever married[2]	13.7	16.5	26.4	20.0	26.1	46.5	74.3	58.6
Range	14.1-13.1	16.1-17.5	24.7-29.7	19.2-21.8	25.6-27.1	46.2-47.2	74.3-74.1	58.4-58.9
1995[1]								
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	4.4	5.3	4.7	5.1	3.1	5.3	5.4	5.3
Range	3.9-5.4	5.0-6.0	4.2-5.5	4.7-5.8	2.5-4.4	4.8-6.4	4.9-6.2	4.9-6.3
Married, spouse present	81.1	78.4	70.9	75.6	71.8	48.8	20.5	35.9
Range	81.2-81.0	79.3-76.4	73.6-65.3	77.2-72.4	73.2-68.9	49.9-46.8	20.8-19.7	36.7-34.5
Other ever married[2]	14.5	16.3	24.5	19.3	25.1	45.9	74.2	58.7
Range	14.9-13.5	15.7-17.5	22.1-29.2	18.0-21.8	24.3-26.6	45.3-46.8	74.2-74.1	58.5-59.2

[1] Base date of projections is March 1978. [2] Comprises divorced, widowed, and married, spouse absent.

Source: U.S. Bureau of the Census, Current Population Reports, Series P-20, Nos. 105, 144, 287, 372, and Series P-25, No. 805.

Table 7-3. Living Arrangements of the Population 55 Years and Over, by Age and Sex: 1965 to 1981

(Numbers in thousands. Total resident population excluding members of the Armed Forces in military barracks. Figures are for March of year indicated)

Living arrangements and year	Male				Female			
	55 to 64 years	65 to 74 years	75 years and over	65 years and over	55 to 64 years	65 to 74 years	75 years and over	65 years and over
1981								
Number	10,256	6,874	3,632	10,506	11,671	8,981	6,555	15,536
In households	10,107	6,727	3,375	10,102	11,563	8,780	5,785	14,565
Living alone	928	761	689	1,450	2,051	3,075	2,959	6,034
Spouse present	8,275	5,429	2,354	7,783	7,762	4,247	1,263	5,510
Living with someone else	904	537	332	869	1,750	1,458	1,563	3,021
Not in households	149	147	257	404	108	201	770	971
Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
In households	98.5	97.9	92.9	96.2	99.1	97.8	88.3	93.8
Living alone	9.0	11.1	19.0	13.8	17.6	34.2	45.1	38.8
Spouse present	80.7	79.0	64.8	74.1	66.5	47.3	19.3	35.5
Living with someone else	8.8	7.8	9.1	8.3	15.0	16.2	23.8	19.4
Not in households	1.5	2.1	7.1	3.8	0.9	2.2	11.7	6.3
1975								
Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
In households	98.1	97.1	92.7	95.6	98.8	97.5	90.0	94.4
Living alone	7.6	12.1	18.2	14.2	17.4	32.9	40.6	36.0
Spouse present	80.7	79.6	63.3	74.0	66.1	46.2	20.1	35.6
Living with someone else	9.7	5.4	11.2	7.4	15.3	18.4	29.3	22.8
Not in households	1.9	2.9	7.3	4.4	1.2	2.5	10.0	5.6
1970								
Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
In households	97.6	96.4	93.7	95.5	98.4	97.6	91.1	95.0
Living alone	7.2	11.3	19.1	14.1	17.1	31.6	37.0	33.8
Spouse present	82.3	75.2	60.4	69.9	63.8	43.5	19.1	33.9
Living with someone else	8.1	9.9	14.2	11.5	17.5	22.4	35.0	27.4
Not in households	2.4	3.6	6.3	4.5	1.6	2.4	8.9	5.0
1965								
Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
In households	97.5	97.5	93.6	96.2	98.4	97.4	92.0	95.3
Living alone	7.0	11.7	15.7	13.1	15.5	27.9	29.9	28.6
Spouse present	80.3	75.3	54.0	67.9	63.8	43.3	19.0	34.1
Living with someone else	10.2	10.5	23.9	15.2	19.1	26.1	43.1	32.6
Not in households	2.5	2.5	6.4	3.8	1.6	2.6	8.0	4.7

Source: U.S. Bureau of the Census, Current Population Reports, Series P-20, Nos. 144, 287, and 372, and unpublished data for March 1970 (revised).

Table 7-4. Comparison of Male and Female Death Rates for Married Persons 55 Years and Over, by Age: 1959-61

(Rates per 100,000 population)

Female		Male		Ratio Male/Female
Age	Rate	Age	Rate	
55 to 59 years	802.1	60 to 64 years	2,504.8	3.123
60 to 64 years	1,291.2	65 to 69 years	3,663.5	2.837
65 to 69 years	1,998.9	70 to 74 years	5,236.5	2.620
70 years and over	4,646.7	75 years and over	9,905.9	2.132

Source: Based on U.S. Public Health Service, National Center for Health Statistics, "Mortality from Selected Causes by Marital Status, United States," by A. Joan Klebba, Vital and Health Statistics, Series P-20, Nos. 8a and 8b, 1970.

Table 7-5. Percent Distribution of the Population 65 Years and Over by Family Status, by Sex: 1965 to 1981

(Total resident population excluding members of the Armed Forces in military barracks. Figures are for March of year indicated)

Family status	Both sexes				Male				Female			
	1981	1975	1970	1965	1981	1975	1970	1965	1981	1975	1970	1965
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
In families	64.1	65.8	67.1	70.4	80.3	79.8	79.1	80.2	53.2	56.1	58.5	62.9
Householder	35.3	36.2	36.3	37.2	73.2	76.0	72.9	71.2	9.6	8.4	9.8	10.7
Married, spouse present	29.4	30.0	28.9	29.2	70.3	73.1	69.0	66.8	1.6	(NA)	(NA)	(NA)
Other family householder	5.9	6.2	7.3	8.0	2.8	2.9	3.9	4.4	8.0	8.4	9.8	10.7
Spouse of householder	21.2	20.7	19.3	18.7	3.0	(NA)	(NA)	(NA)	33.5	35.0	33.3	33.3
Other relative	7.6	9.0	11.5	14.5	4.0	3.7	6.3	9.0	10.1	12.7	15.4	18.8
Not in families	35.9	34.2	32.9	29.6	19.7	20.2	20.9	19.8	46.8	43.9	41.5	37.1
Nonfamily householder	29.7	28.0	26.6	23.3	14.7	14.8	14.9	13.9	39.8	37.3	35.2	30.6
Secondary individuals	1.0	1.2	2.1	2.3	1.3	1.2	2.4	2.4	0.9	1.3	1.9	2.3
Inmates of institutions	5.2	4.9	4.1	4.0	3.8	4.2	3.6	3.5	6.2	5.3	4.4	4.3

NA Not applicable.

Source: U.S. Bureau of the Census, Current Population Reports, Series P-20, Nos. 144, 287, and 371, and unpublished data for March 1970 (revised).

Table 7-6. Percent Distribution of Households by Type, for Householders 65 Years and Over, by Age Group: 1970 to 1995

(Relates to the noninstitutional population excluding members of the Armed Forces in military barracks. Figures are for March of year indicated)

Type of household and age of householder	1970	1975	1981	1990[1]	1995[1]
HOUSEHOLDER 65 AND OVER					
All households	100.0	100.0	100.0	100.0	100.0
Family households	57.6	56.3	54.3	51.2	50.0
Married-couple family	46.0	46.7	45.2	44.4	44.1
Other family, female householder	9.0	7.8	7.3	5.4	4.7
Other family, male householder	2.6	1.9	1.8	1.3	1.2
Nonfamily households[2]	42.4	43.7	45.7	48.8	50.0
Male householder	9.9	9.4	9.1	9.6	9.5
Female householder	32.5	34.2	36.6	39.2	40.5
HOUSEHOLDER 65 TO 74 YEARS					
All households	100.0	100.0	100.0	100.0	100.0
Family households	62.0	61.8	61.2	57.6	56.9
Married-couple family	51.8	53.0	52.7	50.8	50.8
Other family, female householder	8.3	7.2	6.8	5.5	4.9
Other family, male householder	1.9	1.6	1.7	1.3	1.2
Nonfamily households[2]	38.1	38.2	38.8	42.4	43.1
Male householder	8.4	8.6	8.0	9.3	9.6
Female householder	29.7	29.7	30.8	33.1	33.5
HOUSEHOLDER 75 AND OVER					
All households	100.0	100.0	100.0	100.0	100.0
Family households	50.6	47.2	43.8	41.9	40.8
Married-couple family	36.5	36.1	33.8	35.2	35.2
Other family, female householder	10.3	8.7	8.2	5.3	4.4
Other family, male householder	3.7	2.4	1.9	1.4	1.2
Nonfamily households[2]	49.4	52.8	56.2	58.1	59.2
Male householder	12.4	10.9	10.7	10.1	9.3
Female householder	37.0	41.9	45.5	48.0	49.9

[1] Base date of projections is March 1978.

[2] Corresponds to number of primary individuals.

Source: U.S. Bureau of the Census, Current Population Reports, Series P-20, Nos. 218, 287, 371, and P-25, No. 805.

Table 7-7. Mean Age at Which Selected Critical Life Events Occurred for Ever-Married White Mothers Born in 1900-49, and Ever-Married White Mothers Born in 1900-49 Who Have Married Once and Who Have Completed High School, by Birth Cohort: June 1975

Life cycle event	Birth cohort				
	1940-49	1930-39	1920-29	1910-19	1900-09
EVER-MARRIED WHITE MOTHERS					
Age at first marriage	20.2	20.6	21.4	22.2	21.7
Age at birth of first child	21.8	22.3	23.6	24.6	24.2
Age at birth of last child	25.4	29.1	31.2	31.5	30.8
Mean number of children	2.4	3.4	3.3	3.0	3.0
WHITE MOTHERS, MARRIED ONCE, 12 YEARS EDUCATION					
Age at first marriage	20.3	20.7	21.8	23.3	23.0
Age at birth of first child	21.9	22.6	24.3	26.1	25.9
Age at birth of last child	25.3	28.9	31.3	32.1	31.3
Mean number of children	2.3	3.2	3.0	2.7	2.5

Source: Graham B. Spanier and Paul C. Glick, "The Life Cycle of American Families: An Expanded Analysis," Journal of Family History, Vol. 5, No. 1, Spring 1980, tables 1 and 3.

Table 7-8. Measures of the Marital Life Cycle of Men and Women, for Selected Birth Cohorts: 1908-12 to 1938-42

Item (years)	Males					Females				
	Cohort born in				1975 (period data)	Cohort born in				1975 (period data)
	1908-12	1918-22	1928-32	1938-42		1908-12	1918-22	1928-32	1938-42	
Average age at first marriage	26.2	25.0	23.8	23.3	25.0	23.3	22.3	21.1	21.2	23.1
Average duration of first marriage	28.7	28.9	28.5	26.1	23.6	29.5	29.2	29.7	27.4	23.9
Percentage of first marriage ending in—										
Divorce	25.1	29.3	33.2	39.4	43.0	23.8	27.3	31.5	36.7	41.6
Widowhood	22.8	21.1	19.6	17.6	16.5	53.0	50.3	48.5	45.1	41.5
Death	52.0	49.6	47.3	43.0	40.5	23.2	21.2	19.9	18.3	16.8
Mean age at—										
Widowhood	64.5	66.7	67.8	68.4	68.8	64.7	65.6	66.0	66.1	66.4
Divorce	40.7	39.7	40.1	38.7	36.8	37.4	36.5	37.1	36.5	34.4
Mean duration of—										
Widowhood	6.6	6.7	6.7	6.6	6.6	14.4	14.3	14.4	14.3	14.3
Divorce	4.4	4.4	4.5	4.2	4.2	8.9	8.7	9.7	9.6	9.0

Source: Robert Schoen, William L. Urton, Karen Woodrow, John Baj, Family Formation and Dissolution in 20th Century America: A Cohort Analysis, PASS WP 8103, Department of Sociology, University of Illinois, Urbana, Illinois, August 1981.

Table 7-9. Familial Aged Dependency Ratios With One Elderly Generation: 1930 to 2030

(Figures are shown for July 1 of the year indicated. Familial aged dependency ratios relate a group of elderly or aged persons to a group of younger adults of appropriate ages in a parent-child relationship.

Year	Ratio:[1] Actual series			Index:[2] Actual series		
ESTIMATES						
1930	82			44		
1940	95			51		
1950	166			90		
1960	129			70		
1970	135			73		
1980	185			100		
1981	189			102		
	Middle series	Highest series	Lowest series	Middle series	Highest series	Lowest series
Projections[3]						
1985	192	192	193	104	104	104
1990	174	174	174	94	94	94
1995	142	143	142	77	77	77
2000	126	127	125	68	69	68
2005	114	115	112	62	62	61
2010	126	126	123	68	68	66
2015	171	171	169	92	92	91
2020	220	219	216	119	118	117
2025	252	252	247	136	136	134
2030	241	240	239	130	130	129

[1] Ratios here are: $\frac{\text{Population 65 to 79 years}}{\text{Population 45 to 49 years}} \times 100$

[2] The base year is 1980.

[3] See text for explanation of middle, highest, and lowest series. Base date of projections is July 1, 1981.

Source: Based on U.S. Bureau of the Census, Current Population Reports, Series P-25, Nos. 311, 519, 614, 917, and 922.

Table 7-10. Relative Survival of Women From Parenthood to Old Age and of Newborn Children to Middle Age, According to Life Tables for 1929-31 to 1978

(Since the survival rates are calculated from conventional life tables, the measures are "period" measures for the years indicated)

Life table (year)	Survival rate, birth to middle age[1]	Survival rate, parenthood to old age[2]	Relative survival of "mothers" and "children"
1929-31[3]	.7832	.4810	.614
1939-41	.8237	.5235	.636
1949-51	.8821	.6035	.684
.955	[illegible]	.6386	.711
1959-61	.9016	.6573	.729
1965	.9021	.6654	.738
1969-71	.9036	.6771	.749
1975	.9160	.7055	.770
1978	.9225	.7168	.777

[1] Survival rate from birth to ages 45.0 - 50.0 years (exact ages) for both sexes.
[2] Survival rate from ages 17.5 - 32.5 years (exact ages) to 65.0 - 80.0 years (exact ages) for women.
[3] Whites only.

Table 7-11. Familial Aged Dependency Ratios With Two Elderly Generations: 1930 to 2030

(Familial aged dependency ratios relate a group of elderly or aged persons to a group of younger adults of appropriate ages in a parent-child relationship)

Year	Ratio A[1]						Ratio B[2]					
	Ratio: Actual series			Index[3]: Actual series			Ratio: Actual series			Index[3]: Actual series		
ESTIMATES												
1930[4]	21			41			10			38		
1940[4]	24			46			10			38		
1950[4]	29			55			12			45		
1960[4]	36			69			15			58		
1970	43			83			20			79		
1980	52			100			26			100		
1981	53			102			27			103		
	Middle series	Highest series	Lowest series	Middle series	Highest series	Lowest series	Middle series	Highest series	Lowest series	Middle series	Highest series	Lowest series
PROJECTIONS[5]												
1985	57	57	57	111	111	110	30	30	30	117	117	116
1990	71	72	69	137	138	133	35	35	33	134	137	129
2000	96	102	90	186	197	174	56	62	51	219	239	198
2005	91	99	83	175	192	160	61	70	54	238	272	207
2010	77	87	68	148	167	131	58	69	49	226	267	191
2015	69	80	60	134	155	116	49	60	40	190	233	155
2020	65	76	55	126	147	107	44	56	35	171	215	136
2025	74	87	63	143	167	121	43	53	33	162	207	127
2030	101	118	87	196	227	167	49	62	38	189	239	148

[1] $\frac{\text{Population 80 and over}}{\text{Population 60 to 64 years}} \times 100$

[2] $\frac{\text{Population 85 and over}}{\text{Population 65 to 69 years}} \times 100$

[3] Base year is 1980.
[4] Based on census data and relates to April 1.
[5] See text for explanation of middle, highest, and lowest series; base date of projections is July 1, 1981.

Source: Based on U.S. Bureau of the Census, Current Population Reports, Series, P-25, Nos. 311, 519, 614, 917, and 922, and 1930, 1940, 1950, and 1960 population censuses.

Table 7-12. Educational Attainment of the Population 65 Years and Over and 25 Years and Over, by Sex: 1959 to 2000

(Figures are for March of year indicated. Base date of projections is March 1979)

Sex and year	Median school years completed			Percent high school graduates		
	65 years and over	25 years and over	Ratio, 65 and over to 25 and over	65 years and over	25 years and over	Ratio, 65 and over to 25 and over
BOTH SEXES						
1959	8.3	11.0	0.75	19.4	42.9	0.45
1965	8.5	11.8	0.72	23.5	49.0	0.48
1970	8.7	12.2	0.71	28.3	55.2	0.51
1975	9.0	12.3	0.73	35.2	62.5	0.56
1981	10.3	12.5	0.82	41.8	69.7	0.60
1985	11.3	12.6	0.90	46.2	72.3	0.64
1990	12.1	12.7	0.95	53.3	75.6	0.71
1995	12.2	12.7	0.96	58.4	78.2	0.75
2000	12.4	12.8	0.97	63.7	80.4	0.79
MALE						
1959	8.2	10.7	0.77	18.1	41.3	0.44
1965	8.3	11.7	0.71	21.9	48.0	0.45
1970	8.6	12.2	0.70	25.9	55.0	0.47
1975	8.9	12.4	0.72	33.4	63.1	0.53
1981	10.1	12.6	0.80	40.8	70.3	0.58
1985	11.0	12.7	0.87	45.0	73.2	0.61
1990	12.1	12.8	0.95	52.7	76.7	0.69
1995	12.2	12.9	0.95	57.8	79.4	0.73
2000	12.4	12.9	0.96	62.4	81.4	0.77
FEMALE						
1959	8.4	11.2	0.75	20.4	44.4	0.46
1965	8.6	12.0	0.72	24.7	49.9	0.49
1970	8.8	12.1	0.73	30.1	55.4	0.54
1975	9.3	12.3	0.76	36.5	62.1	0.59
1981	10.4	12.5	0.83	42.5	69.1	0.62
1985	11.5	12.5	0.94	47.0	71.4	0.66
1990	12.1	12.6	0.96	53.7	74.6	0.72
1995	12.2	12.6	0.97	58.8	77.1	0.77
2000	12.4	12.7	0.98	64.6	79.4	0.81

Source: U.S. Bureau of the Census, Current Population Reports, Series P-20, Nos. 45, 99, 158, 207, 295, and 356, and unpublished data.

Table 7-13. Percent Literate for Persons 65 Years and Over and 14 Years and Over, by Race and, by Nativity and Parentage: 1979

(Percentages are based on persons reporting on literacy and, hence, it is assumed that persons not reporting on literacy are distributed in the same proportion as persons who did report on literacy)

Age and literacy	Total[1]	Race		Nativity and parentage		
					Foreign birth or parentage	
		White	Black	Native of native parentage	Native of foreign parentage	Foreign born
65 years and over[2]	100.0	100.0	100.0	100.0	100.0	100.0
Reported able to read and write	98.3	98.9	93.1	98.3	99.4	95.9
Reported unable to read and write	1.7	1.1	6.8	1.7	0.6	4.1
14 years old and over[2]	100.0	100.0	100.0	100.0	100.0	100.0
Reported able to read and write	99.4	99.6	98.4	99.5	99.5	98.2
Reported unable to read and write	0.6	0.4	1.6	0.5	0.5	1.8

[1] Includes other races and persons not reporting nativity, not shown separately.

[2] About 4 percent of the population 65 years and over and about 3 1/2 percent of the population 14 years and over did not report on literacy.

Source: U.S. Bureau of the Census, Ancestry and Language, Current Population Reports, Series P-23, No. 116, table 8.

Chapter 8.
Economic Characteristics

LABOR FORCE PARTICIPATION

Past trends. During the last few decades there have been sharp declines in the proportion of men in the labor force (i.e., working or looking for work) at the older ages. The labor force participation of males over age 65 dropped from 33 percent in 1960 to 27 percent in 1970 and then to 18.5 percent in 1981 (table 8-1). Just as striking has been the decline in the proportions of men in the labor force at earlier ages. Labor force participation of men aged 60 to 64 fell from 81 percent in 1960 to 75 percent in 1970 and then to 59 percent in 1981. Nine out of ten men 55 to 59 years old (92 percent) were working in 1960, and only 4 out of 5 (81 percent) were working in 1981.

In contrast, the proportion of older women in the labor force has risen or fallen only moderately since 1960. For women over age 65, the proportion had been falling very gradually, but in the most recent years, no change was recorded (table 8-1). In 1960, 1 out of 9 elderly women (11 percent) was in the labor force, but in 1975 and 1981, the ratio was only 1 out of 12 (8 percent). On the other hand, there was a notable increase in the labor force participation ratio of women aged 55 to 64 in this period. The ratio rose from 37 percent in 1960 to 41 percent in 1981. Worker ratios for women rose sharply at most younger ages.

The trend of labor force participation of older Black men has been similar to that of older White men; the ratios for Blacks at corresponding ages are somewhat lower, however. The trend of labor force participation of older Black women has also been similar to that of older White women, but the ratios at corresponding ages are higher.

Part-time work is very common among the elderly population, as it is among the very young. In 1979, among employed persons 65 years and over, 48 percent worked at voluntary part-time jobs; the corresponding figure for persons 16 to 19 years old was nearly the same, 46 percent.[109] The figures for all part-time workers, including those who worked part-time for economic reasons, are 63 percent for the elderly and 54 percent for the teenagers.

Factors associated with past trends. A number of factors may be enumerated to account for the steady decline in the labor force participation of older men. The decline reflects the combined effect of the increase in voluntary retirement associated with the more widespread eligibility of workers under Social Security and other pension plans, the increase in disability retirements, pressures on older workers to retire exerted by employers, withdrawal of discouraged older workers from the labor force in the face of age discrimination in hiring, the decline in self-employment (a class of work which tends to discourage early retirement), and the decline in jobs for which little education and skill are required.

The most important factor in the decline of the worker ratios of older men is the growing financial ability of older workers to retire, associated with the growth in retirement programs, and their readiness to do so at the earliest opportunity.[110] Social Security coverage has greatly expanded, and benefits have grown. Benefits under Social Security have been adjusted for cost-of-living increases, and in addition, they have been increased greatly over the last 30 years in constant dollars. Older workers first become eligible for reduced Social Security benefits at age 62 (for men beginning in 1961 and for women beginning in 1956) and for full Social Security benefits at age 65. As a result, the greatest negative shifts in the labor force participation of men occur between ages 61 and 62 and between ages 64 and 65. The marked increase in "job-specific" public and private pensions systems (i.e., in addition to Social Security) has also enhanced the financial ability of older workers to retire.

Other factors that influence workers' decisions to retire include job satisfaction, number of dependents, health status, and the number and income of other workers in the family. In general, these factors have been exerting an increasing influence. Growing job dissatisfaction, the general decline in the number of family dependents, increases in work-disability, and the sharp increase in the proportion of married-couple families with female members who work may have contributed indirectly to the decline in worker ratios for men at the older ages.

Ill-health has been an important reason for retirement of older men in the "preretirement" ages, and as documented later, retirements of older men based on disability have been growing. The available evidence suggests that the proportion of men 50 to 69 years of age or 55 to 64 years of age reported as being unable to work because of illness has been increasing in the last several decades.[111] In addition, workers with impairments appear to have more difficulty in locating suitable alternative employment currently than previous generations of impaired workers; there are probably fewer jobs for "oldsters," and there may be greater institutional barriers to part-time employment.

---

[109] U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, Vol. 27, No. 1, January 1980, tables 3 and 8 and unpublished data obtained from the Bureau of Labor Statistics.

[110] Philip L. Rones, "Older Men—The Choice Between Work and Retirement," *Monthly Labor Review*, Vol. 101, No. 11, November 1978, pp. 3-10; Carl Rosenfeld and Scott Campbell Brown, "The Labor Force Status of Older Workers," *Monthly Labor Review*, Vol. 102, No. 11, November 1979, pp. 12-18; and James R. Storey, "Financial Disincentives for Continued Work by Older Americans," paper presented at the Annual Meeting of the Gerontological Society of America, San Diego, California, November 23, 1980.

Another factor is the declining importance of occupations for which the educational qualifications are very low, such as factory worker and farm and nonfarm laborer. Some employers may increase the educational requirements needed to perform a particular job because an ample supply of unemployed persons who can satisfy the original educational requirements is available. Since unemployed older men tend to have less education than younger workers, they are at a disadvantage when seeking jobs; this disadvantage is reflected in their longer average duration of unemployment.[112]

Although older workers are often protected by seniority against job loss, they are as vulnerable as younger workers to plant shutdowns or business closings. Confronted by a job change, older workers face many problems. One is discrimination by employers in being hired. This practice is rationalized by assumptions regarding the poor health prospects, limited trainability, and low adaptability of older workers. The higher cost of pensions and fringe benefits borne by employers contributes to the reluctance of employers to hire older workers. Because of age discrimination in hiring, older workers are often discouraged from seeking employment and withdraw from the labor force.

There are, however, some influences working to reverse the trend toward falling worker ratios of older men. These factors include the introduction of flexible work programs, the recent history of very high inflation rates and anticipation of their return, the decline in the proportion of younger workers and the resulting improvement in the competitive earnings position of older workers, and the outlawing of mandatory retirement at age 65. The extension of life expectancy, efforts to reduce the abuse of disability as a basis for retirement, advances in the treatment of chronic nonlethal conditions, and the prospect of changes in personal habits and lifestyle leading to the reduction of disabling conditions should give additional support to the prospect of a rise in worker ratios. Finally, the government programs aimed at improving health-related conditions in the workplace and prohibiting use of toxic and carcinogenic substances may also decrease the proportion of workers retiring because of ill-health.

Several studies, including one prepared by the Social Security Administration, have shown that private pensions often do not keep pace with inflation.[113] Between 1973 and 1981, the annual inflation rate fluctuated between 6 percent (1973 and 1976) and 14 percent (1980). The rate has been sharply reduced in the last few years, however. If inflation rates had continued at, or even close to, the very high levels of the last several years, the purchasing power of private pensions would soon erode rapidly. Thus, some workers eligible for early retirement may be holding on to their jobs in fear of a return to extremely high rates of inflation, awaiting the return of stable financial conditions before retirement. Many may be forced to delay retirement if heavy inflationary pressures return.

Because of the increasing availability and popularity of early retirement provisions under private pension plans and the high and increasing levels of life expectancy at the older ages, many retirers who receive private pension incomes will have long periods of retirement. For example, according to the death rates of 1978, half the men surviving to age 62 are expected to live another 15 years, and one-quarter are expected to live another 22 years.

The proportion of younger workers will diminish as a result of the decline in birth rates in the 1960's and 1970's, and this trend may relax the pressure on older workers to retire. There may even be a shortage of workers in various lines of work, especially unskilled work. The demand for labor may encourage some older persons to remain in the labor force for a longer period so as to build up their retirement benefits. Some may "retire" and return to the work force in less skilled occupations or part-time programs.

Government actions may also induce or at least permit some workers to remain in the labor force who would not otherwise continue working. The recent Federal law prohibiting compulsory retirement of workers in private industry before the age of 70 may serve to permit, if not induce, some workers who planned to retire before age 70 to work longer. Until 1978, the age of compulsory retirement was, in effect, 65. This age was implied in the Age Discrimination in Employment Act (ADEA) of 1967, which prohibits age discrimination in hiring, discharge, compensation, and other terms of employment of persons up through age 64. The law was amended in 1978 to include workers up through the age of 69. It is unlikely, however, that the change in coverage under the ADEA has had or will have a sizeable impact on employment of older workers. This is so because relatively few workers who are not self-employed and who would not otherwise be able to work wish to continue working beyond age 65. A recent change in the Social Security law increases the benefits from 1 percent to 3 percent for each year that prospective retirers continue to work past age 65.[114] Many workers would choose to delay retirement or be forced to delay retirement if age of eligibility for Social

---

[111] See chapter 6, and also Jacob J. Feldman, "Work Ability of the Aged Under Conditions of Improving Mortality," prepared for the National Commission on Social Security Reform, June 21, 1982.

[112] James H. Schulz, *The Economics of Aging*, Wadsworth Publishing Company, Belmont, California, 1980; and U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, Vol. 29, No. 1, January 1982, tables A-18 and 18, and Vol. 28, No. 1, January 1981, tables A-18 and 18.

[113] Gail B. Thompson, "Impact of Inflation on Private Pensions of Retirers, 1970-74: Findings from the Retirement History Study," *Social Security Bulletin*, Vol. 41, No. 11, November 1978, pp. 16-25.

[114] John Snee and Mary Ross, "Social Security Amendments of 1977: Legislative History and Summary of Provisions," *Social Security Bulletin*, Vol. 41, No. 3, March 1978, pp. 3-29.

Security benefits is raised, as has been proposed.

Several factors are related to the increase in the labor force participation of older women. We may note particularly the high inflation and interest rates, "forcing" many women into the labor force to supplement their husband's income;[115] the tendency of children to leave home at an early age, thus reducing the parents' burden of household management; the increased educational levels of women over age 55, permitting them to compete more successfully in the labor market; the rise in the divorce rate and in the proportion of women maintaining their own households, drawing the women into the labor force for reasons of economic necessity, self-fulfillment, or the desire to structure "leisure" time; and changing views as to the roles, needs, and aspirations of women. In addition, older women represent, in general, a more stable and cheaper labor force than younger women.

Prospects. The task of projection is rendered difficult by the fact that several factors strongly support an increase in the proportion of older male workers in the labor force, while others strongly support a decrease. There has been a persistent downward trend in the proportion in spite of the many factors that would contribute to an increase. The most recent projections of the labor force prepared by the Bureau of Labor Statistics essentially anticipate a continuation of the decline in the labor force participation ratios of older male workers, at least up to the year 2000.[116] Three series of projections (middle, high, and low) were developed, each based on a different assumption regarding the rate of change in labor force participation ratios after 1979. Each of the three series of labor force participation ratios was combined with the medium population projections of the Census Bureau published in 1978 (base year, 1976). The assumptions essentially continue into the future trend of the past two decades in the labor force participation of older men and women.

Under the middle assumption, there is a drop in the worker ratio for men 55 to 64 years of age between 1981 and 2000 of approximately 4 percentage points and the projected work force of men 55 to 64 years old increases by a few percent (tables 8-1 and 8-2). Under the high assumption, the projected male worker ratio in this age group increases by a few percentage points and the work force increases markedly, by some 14 percent. Under the low growth assumption, the decline in the labor force participation ratio and in the work force of men 55 to 64 years of age are pronounced, 14 percentage points and 12 percent, respectively.

Worker ratios for men 65 years and over are assumed essentially to remain unchanged or to decline between 1981 and 2000. The middle series shows a projected drop of 5 percentage points in the worker ratio and 13 percent in the number of male workers in this period (tables 8-1 and 8-2). The high series of labor force growth assumes near constancy of the ratios and the low series a drop of 9 percentage points. The work force increases by nearly one quarter in the high series and declines by over one-third in the low series.

The projected labor force participation ratios for women 65 years and over show a continuous decline between 1981 and 2000 under the various labor force assumptions, but the numbers in the labor force rise sharply (12 percent) or decline (4 percent) depending on the series. The projected labor force participation ratios of women 55 to 64 years increase slightly between 1981 and 2000 under the medium assumption; there is a somewhat greater increase under the high assumption and a slight decrease under the low assumption. In all series, the female labor force at this age shows a substantial rise in this period, approximating 11 percent in the middle series.

The projected labor force participation ratios of older Black men are lower than for older White men in the corresponding ages. However, the pattern of changes over time is assumed to be similar. Conversely, the projected ratios for Black women are higher than those for White women in the corresponding age groups; again the trends are assumed to be similar.

If these projections are realized, especially the low growth series, we can anticipate a continuation of the rise in the ratio of older nonworkers to workers. As will be discussed further, such a development could pose serious problems for the condition of the Social Security Trust Funds. Of special concern would be the financial solvency of the Social Security Retirement System and the financial burden on taxpayers and workers of ensuring the solvency of the system.

While continued employment is not a practical alternative for many elderly persons, the pursuit of work, for those who are able to work, strengthens not only the individual's economic well-being but also the ability of the general economy to support those who cannot work. Especially in a time of persistent inflation, even at moderate levels, the employment of most older persons may be of great financial importance to both the individual and society. Because of the high financial costs of early retirement for many persons and society, careful consideration should be given to the factors conducive to early retirement and to the ways by which this practice could be reversed.[117] It is ironic that a major social goal pursued for most of this century and now finally nearing achievement, the entitlement to retirement on the part of workers at an "early" age after long years of work must now be viewed as a major social problem.

---

[115] Of course, the causal path between inflation and the trend toward two-worker families (resulting in higher family income) flows both ways. The labor force trend is itself a factor in inflation, albeit a secondary one. See N.J. Semlar and Alfred Tella, "Inflation and Labor Force Participation," pp. 155-167, in *Stagflation: The Causes, Effects, and Solutions*, Vol. 4, Studies prepared for the use of the Special Study on Economic Change of the Joint Economic Committee,Congress of the United States, December 17, 1980.

[116] Howard N. Fullerton, Jr., "The 1995 Labor Force: A First Look," *Monthly Labor Review*, Vol. 103, No. 12, December 1980, pp. 11-21. The corresponding labor force projections for 2000 were not published in this source. For details about the methodology of the labor force projections, see appendix D.

[117] Harold L. Sheppard and Sara E. Rix, *The Graying of Working America: The Coming Crisis of Retirement-Age Policy*, The Free Press, New York, 1977, chapters 9 and 10.

Measurement of retirement trends. The "conventional" retirement age is generally considered to be 65 years, and 65 is a common age of retirement. People retire at many different ages, however. We are interested in ascertaining whether average age at retirement and the age pattern of retirement have been changing.

Retirement may be defined in many different ways. One common definition incorporates the concept of a shift in principal source of income from earnings to a pension in older age on leaving a long-term job. Alternatively, retirement may be defined as complete and permanent withdrawal from the labor force in older age for reasons other than death and emigration. However retirement is defined, no satisfactory analysis of the trend of retirement in terms of a measure such as average age at retirement has been made. Some indicators suggest that average retirement age for men has been falling sharply in recent decades but more careful analysis suggests that average retirement age of men has hardly changed or has fallen only slightly.

A decline in the retirement age of men is suggested by the trend of labor force participation ratios at the older ages over most of the post-War period. The labor force participation of men 55 to 64 years of age declined steadily from 85 percent in 1950 to 71 percent in 1981. There was an even larger decline in the work participation of men 65 years old and over in this period. In 1981, less than 1 in 5 men 65 years old and over (18.5 percent) was in the labor force as compared with 1 in 2 (46 percent) in 1950. In contrast, there is no suggestion in worker ratios of earlier retirement of women between 1950 and 1981. The worker ratio for women 55 to 64 years increased sharply (from 27 percent in 1950 to 41 percent in 1981), while the worker ratio for women 65 years and over dropped only a few percentage points (from 10 percent in 1950 to 8 percent in 1981).

Use of labor force participation ratios to measure retirement implies the definition of retirement as complete and permanent withdrawal from the labor force in older age for reasons other than death and emigration. Changes in labor force participation ratios do not measure retirement per se, however, because of the confounding effect of mortality and the inappropriate structure of the ratios. Labor force participation ratios can decline without affecting the corresponding average age of retirement, especially if there are large declines in the ratios at the ages above and below the initial average. It can be demonstrated that it is incorrect to infer a decline in average retirement age of men from a decline in labor force participation ratios for older men. The two series may move in different directions. In fact, according to an analysis by Reimer, average retirement age in the age range 52.5 to 72.5 years appears to have been rather stable around age 65 over several birth cohorts, while the variation in retirement ages around this average appears to have decreased.[118]

Changes in age at retirement were measured for the present purpose by computing the median age of the retirement rates in the age range 50 to 72 given in, or calculated from, a series of official (U.S. Bureau of Labor Statistics) tables of working life for 1940 to 1970. The computation on the basis of rates serves to eliminate the effect of the change in the age distribution of the population on the resulting medians. The medians did not show the pronounced downward trend over this period that might have been expected on the basis of the trend of labor force participation ratios, only a modest decline concentrated in the 1950-60 decade:

Year	Median age	Difference over previous decade
1970..........	65.6	+0.2
1960..........	65.4	-1.6
1950..........	67.0	-0.2
1940..........	67.2	x
1940-70.......	x	-1.6

Alternatively, standardized median ages of retirement over the age range 50 to 72 were computed for 1940 and 1970. For this purpose, the age-specific retirement rates given in the official tables of working life were used in combination with the average of the populations of 1970 and 1940 as a standard. The two age-standardized figures were 66.0 for 1940 and 64.8 for 1970 and also reflected only a modest decline for this whole period.

If retirement is defined, however, as leaving a long-term job and subsequently receiving a pension (but not necessarily withdrawing from the labor force), retirement may be occurring earlier, but the data are inadequate to provide an answer to the question. A way of appraising the change in the age at retirement following this concept of retirement is to examine the shift in the proportions of eligible persons at the older ages receiving retirement benefits under the Social Security program.[119] (The number and proportion of all workers who were eligible to receive Social Security benefits increased very rapidly in the 1950's and 1960's and slowly in the 1970's.) In the early 1970's, there was a rapid increase in the proportion of workers who were retired with full benefits and an especially rapid increase in the proportion of workers who were retired with reduced benefits. The proportion of eligible workers receiving benefits at ages 65 to 71 rose from 80 percent in 1970 to 87 percent in 1975 and further to 89 percent in 1981. The proportion of eligible men who were retired at ages 62 to 64 (with reduced benefits) increased from 24 percent in 1970 to 33 percent in 1975 and further to 38 percent in 1981. For women of these ages there was a parallel increase; 40 percent of eligible women received

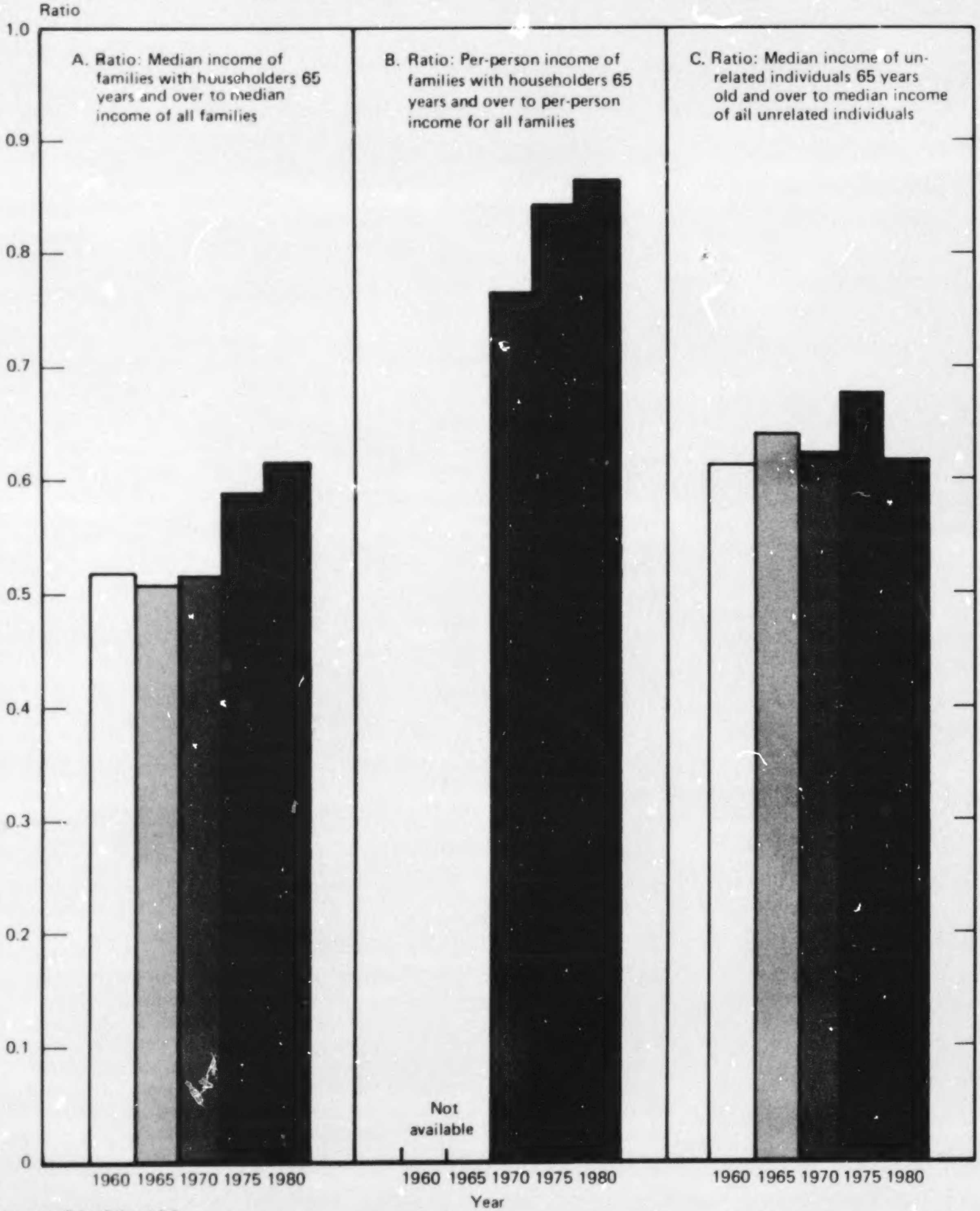
---

[118] Cordelia Reimer, "Is the Average Age at Retirement Changing?" *Journal of the American Statistical Association*, Vol. 71, No. 355, September 1976, pp. 552-558.

[119] These proportions are also affected by deaths. Additional age detail and the calculation of age-specific rates of "retirement" from the proportions for a series of dates would be required to ascertain the shift in age at retirement.

FIGURE 8-1.

Ratio of Median Income for Families With Householders 65 Years and Over to Median Income for All Families: 1960 to 1980



Source: Table 8-4 and 8-5.

benefits in 1970 and 49 percent received benefits in 1981 (table 8-3). Clearly, many persons in this age group received reduced Social Security benefits.[120] The Social Security Administration reported that 62 percent of male workers and 74 percent of female workers who began receiving old-age benefits in 1978 received reduced benefits.

There was also a marked increase in the proportion of men 62 to 64 years of age who drew disabled-worker benefits; the proportion rose from 7 percent in 1965 to 15 percent in 1981. The proportion of women in this age group drawing disabled-worker benefits also increased greatly in this period, from 4 percent to 10 percent. The rise in the proportion of workers drawing disabled-worker benefits results from a combination of factors, including increased familiarity with the disability-entitlement program, rising work-disability rates, increasing abuse of the program, and the increased general tendency toward retirement.

MONEY INCOME AND NONCASH BENEFITS

Money income of families and unrelated individuals. Although we will be concerned here primarily with the income of "elderly" families (i.e., those with householders aged 65 or over), it is useful to compare the income of elderly families with the income of younger families (i.e., those with householders at the pre-retirement and younger ages). The level of income shows a characteristic pattern of variation with age in any year. The incomes of very young workers and the elderly are considerably lower than the incomes of those in the young adult ages and in midlife, and incomes are typically at a peak in late midlife just before the retirement "low." On balance, families with householders aged 65 and over had considerably lower incomes than families in general. In 1980, the median income of families with householders aged 65 and over ($12,965) was less than three-fifths the median income for all families ($22,929). (See table 8-5.) In the last decade, there has been a notable convergence of the median incomes of elderly families and all families, however. The ratio of these medians rose from 0.48 to 0.56 between 1970 and 1980.

The median income of elderly families in 1980 was 4 1/2 times greater than in 1960 and 2 1/2 times greater than in 1970. In constant dollars, the increase in the income of elderly families was about 60 percent over the 1960-80 period and 23 percent over the 1970-80 period.

Elderly unrelated individuals (i.e., those not living with any relatives) have much lower incomes than families with elderly householders. In 1980, unrelated individuals over 65 years old had a median income ($5,096), only 42 percent as great as families with householders over 65 years old ($12,965). The median income of both unrelated elderly individuals and elderly families increased 2 1/2 times between 1970 and 1980, so that the relative income levels of the two types of households hardly changed.

For families maintained by women, the relation between the incomes of older and younger families was the reverse of that for families maintained by men. Families maintained by men 65 years old and over in 1980 had median incomes only 76 percent as great as families maintained by men of all ages (table 8-5). The median income of families maintained by women 65 years old and over, however, was 18 percent higher than that of families maintained by women of all ages.

Families maintained by White women 65 years old and over had a median income somewhat higher than White husband-wife families with elderly householders if the wife was not in the labor force. This relationship was reversed in the case of Blacks. Among Blacks, husband-wife families in which only the husband worked had higher median incomes than Black families maintained by women. The highest family incomes, however, were those of husband-wife families in which both spouses were in the labor force.

In any year, incomes fall off rapidly in older age and after retirement. The median income of families maintained by men 65 years old and over in 1980 was only half as large as that of families maintained by men 55 to 64 years old, and the median income of families maintained by women 65 years old and over was only three-quarters as great as that of women 55 to 64 years old. The difference reflects largely the higher proportion of retired persons in the older age group. This pattern of age variations in income is seen in both Whites and Blacks, but in each of the two age groups the median income of Blacks is considerably lower than that of Whites.

The type of period (calendar year) comparison just made tends to exaggerate the fall-off in income as persons move from the "working" ages to the "retirement" ages. The decline in incomes in the older ages would also occur for actual cohorts, but it would tend to be more gradual than for calendar-year data. The incomes of older persons largely reflect earnings at an earlier period, when incomes tended to be lower than they are "today" for various reasons, including the trend of inflation, shifts in pay scales, increases in education and skills, and expansion of pension programs.[121]

Some analytic issues. We can obtain a more realistic picture of the income status of elderly persons by adjusting total family income for the size of the family and for the omission of noncash benefits and "underground" income. In addition, it would be useful to analyze income data over the age cycle on a cohort basis as well as on a period basis and in more detailed categories with respect to age and socioeconomic characteristics.

Because the size of families maintained by persons 65 years old and over is on the average smaller than that of families maintained by younger persons, the family income is spread over fewer persons in families maintained by elderly persons. A comparison of the per-person median income of families with householders 65 years old and over with the per-person median income of all families provides a more favorable picture of the relative income of elderly persons than a comparison based on the total median income of families. In 1980, the per-person income of families with householders 65 years old and over was about 19 percent below the corresponding figure for all families, whereas the total income of families maintained by elderly persons was 42 percent lower than that of all families (tables 8-4 and 8-5 and figure 8-1). The adjustment to a per-person basis has a favorable effect independent of the sex and race of the householder. Consequently, the relative advantage of families maintained by women, noted earlier, is increased by this adjustment; families maintained by women 65 years old and over had a per-person median income 39 percent greater than all families maintained by women (table 8-5).

---

[120] U.S. Social Security Administration, *Social Security Bulletin: Annual Statistical Supplement, 1977-79*, September 1980, table 55, p. 108.

[121] See chapter 5 in Robert L. Clark and Joseph J. Spengler, *The Economics of Individual and Population Aging*, Cambridge University Press, Cambridge, 1980, for a discussion of "Age and Economic Activities: Life Cycle Patterns."

The adjustment of family income to a per-person basis magnifies the existing gap between the incomes of elderly White and Black families and diminishes the gap between the incomes of families maintained by Black persons 65 and over and all Black families. The per-person income of elderly Black families was about half that of elderly White families in 1980 (table 8-5). The Black-White gap was particularly large for families maintained by elderly women. The per-person income of families maintained by elderly Black women was only 47 percent of the per-person income of families maintained by elderly White women.

Although per-person family income gives a more accurate picture of comparative economic status than total family income, per-person family income does distort somewhat the picture of the comparative economic status of the elderly. Each additional member in a family does not require the same addition to family income because of ''economics of scale,'' so that the per-person income figures for the elderly are too favorable. Furthermore, the age and relationship of family members exert an important influence on family expenses; the needs and expenditure patterns of elderly persons are different from those of their younger counterparts.

Next, one should differentiate between the income of retired persons and those still working. The earners tend to have much higher and more adequate incomes. When their incomes are averaged with those of nonearners, their economic situation appears to be worse than it actually is, and the economic situation of retired persons appears to be better than it actually is. The median income in 1980 of a family maintained by an elderly person who did not work ($11,550) was much lower than that of a family maintained by a householder who worked part time or full time in 1980, especially one who worked full time 27 to 52 weeks ($24,280). (See table 8-6.) Among families with elderly householders who were not working, 66 percent had incomes below $15,000. By contrast, among families with elderly householders working full time more than 27 weeks a year, only 22 percent had incomes below $15,000.

Another problem in analyzing the income data on the elderly is the lumping of all the elderly together in a single age group. An analysis based on one broad age group may be misleading. The needs and expenditure patterns of people who are just 65 years old and those who are 80 or 85 years, some of the latter having retired 15 or 20 years earlier, are often quite different. Unlike the new-old, the extreme aged have high expenditures for health and housing as a result of chronic illnesses and institutionalization, for example. Moreover, the very old tend to have different financial resources from new-old persons both because of the diminution of resources with time and age and the difference in each group's earnings and pension programs prior to retirement. For example, the income of those who retired in the 1980's is much higher than the income of those who retired in the 1970's. Reference has already been made to the desirability of analyzing income data on a cohort basis as well as a period basis.

An age group that merits special attention is the 60-to-64-year age group. This age group includes the early retirement ages 62 to 64. Since persons who retire early include a substantial proportion of the 62-to-64-year age group, it is desirable to secure separate income data for the two age groups, 60 to 61 and 62 to 64, and to analyze the work and income record for the groups separately.

Finally, the census and survey data on income in Bureau of the Census reports are subject to possibly serious limitations of coverage. One major limitation is their restriction to money income by design and probably to legal and recorded money income by default; that is, noncash benefits, illegal income, and underground income are excluded. A later section considers some categories of noncash benefits received by the elderly. Still another limitation is the gross underreporting of income other than wage or salary income, such as self-employment income, interest, dividends, and Supplementary Security Income. As noted later, much of the income of the elderly consists of ''unearned'' income. It is likely, therefore, that the actual income of the elderly is substantially higher than reported.

Poverty status. The great majority of elderly persons are not poor even though elderly persons are more likely to be poor than younger persons. Poverty among the elderly population was considerable until a few decades ago, but the proportion with incomes below the poverty level has been falling sharply. In 1981, 15 percent of the elderly had incomes below the poverty level, as compared with 35 percent in 1959 (table 8-7).

The sex and race of the family householder are important factors related to the poverty status of persons in families. Poverty is more likely to occur in families maintained by women and by Blacks. The percent of families maintained by elderly women with incomes below the poverty level in 1981 (15 percent) was 7 points higher than the percent of poor among families maintained by elderly men (8 percent). (See table 8-8.) The Black elderly are still trailing well behind the White elderly, even though both elderly Whites and Blacks shared in the progress of the last two decades. The percent of families maintained by Black elderly persons, either men or women, with incomes below the poverty level (30 percent) was several times greater than the percent of poor among families maintained by White elderly persons (7 percent).

Poverty was also more likely to occur among individuals not living with relatives. One out of four (26 percent) White unrelated individuals aged 65 or more and nearly 3 out of 5 (59 percent) Black unrelated individuals aged 65 or more were poor (table 8-8). The category among the elderly with the highest percent in poverty (64 percent) consisted of Black women living alone or with nonrelatives.

Sources of income. The single most important source of income for the elderly is Social Security benefits, although earnings (i.e., wages, salaries, and self-employment income), received by the minority of elderly persons who are still working, represent a substantial proportion of the total income received by the elderly.[122]

Elderly persons who had low pre-retirement incomes are likely to have little more than their Social Security benefits to live on. Analysis of the income data for 1978 reveals that 16 percent of the elderly live exclusively on Social Security benefits, and 26 percent more obtain 90 percent of their income through Social Security benefits. Since most persons receiving only Social Security benefits as income or mainly Social Security benefits as income had low earnings when they worked, such persons are receiving benefits near or below the poverty line. We can estimate on this basis that 42 percent of the elderly had an income below the poverty level or not far above it in 1978.

A more detailed picture emerges from an examination of table 8-9. According to the data shown in this table, in 1980, families with elderly householders had incomes principally from sources other than earnings, i.e., Social Security payments, pensions, public assistance, property income, and related sources. Over two-fifths of the families with elderly householders received incomes from both earnings and sources other than earnings, over half of the families had incomes only from sources other than earnings, and a mere 1 percent had incomes from earnings only. On the other hand, among all families one-eighth (13 percent) had incomes from earnings only, another eighth (13 percent) had incomes only from sources other than earnings, and about three-quarters (74 percent) had incomes both from earnings and other sources. In other words, the vast majority of younger families had both earned and unearned income, but most older families depended on unearned income only.

Among elderly unrelated individuals, 1 in 7 persons (14 percent) had income from both earnings and sources other than earnings, over 5 in 6 persons (85 percent) had incomes only from sources other than earnings, and only 1 percent had incomes from earnings only (table 8-9). Elderly individuals depended almost wholly on income other than earnings, i.e., "transfer" payments or property income. On the other hand, the largest proportion of unrelated individuals of all ages received incomes from both earnings and sources other than earnings (47 percent), and smaller proportions had incomes only from sources other than earnings (34 percent) or from earnings only (19 percent).

It is evident that the distribution of money income by source for families with elderly householders differs sharply from that for unrelated elderly individuals. Although both groups were equally likely to be receiving very little income from earnings only, unrelated individuals were much more likely to receive income only from sources other than earnings and much less likely to receive income from a combination of earnings and other sources. Since income from Social Security and related sources is generally smaller than that from earnings, the total money income of unrelated elderly individuals tends to be much smaller than that of families with elderly householders.

The median incomes from earnings and sources other than earnings for families with elderly householders ($17,716) and for elderly unrelated individuals ($8,528) were considerably higher than the corresponding median incomes from sources other than earnings only ($10,237 and $4,813). This ranking of income sources applied also to families with younger householders, but the relative excess of income including earnings for these families was more pronounced than for older households. The median incomes from earnings and sources other than earnings for all families ($24,203) and unrelated individuals ($12,403) were more than twice as great as the corresponding median incomes from sources other than earnings only.

Although the income of the elderly tends to be lower than that of persons in midlife, many of the former group are better protected from inflation. Social Security benefits have kept pace with inflation. For the past several years, legislation has been in effect that calls for automatic increments in benefits each year to compensate for the reduction in purchasing power resulting from inflation. Federal Government employees' pension income is also "indexed," that is, automatically adjusted to compensate for changes in the cost of living. For the most part, the notion that the elderly have been living on fixed incomes is a fiction.[123]

The elderly who were in the middle-income category just prior to retirement are more likely to be adversely affected by inflation than those with low or high incomes. While Social Security income is protected against inflation, private pension income is not so protected. However, many persons in the middle-income category have savings to supplement their benefits under Social Security and private pension plans.

---

[122] Susan Grad and Karen Foster, "Income of the Population Aged 55 and Older, 1976," *Social Security Bulletin*, Vol. 42, No. 7, July 1979.

[123] Paul L. Grimaldi, "Measured Inflation and the Elderly, 1973 to 1981," *Gerontologist*, Vol. 22, No. 4, August 1982, pp. 347-353; R. L. Clark, G. L. Maddox, R. P. Schrimper, D. A. Sumner, "Inflation and the Economic Well-Being of the Elderly," Final Report for Grant No. 1-RO1-AG02345-01, National Institute on Aging, September 1982, presented at the meeting of the Gerontological Society of America, Boston, Nov. 1962.

Projections of income. Illustrative projections of income for households were prepared by the U.S. Bureau of the Census on the basis of current data on income for 1977.[124] Separate projections are available for family households and nonfamily households according to the age of the householder. The projections of household income were derived by combining various assumptions regarding the annual growth rate in income with the Census Bureau's projections of households.[125] The three series that assume a combination of growth rates in income of 1 percent, 2 percent, and 3 percent with series C or D household projections are examined here for prospective changes in median household income and in the distribution of households by income class.

For family households with householders 65 years and over, the proportion of households with an income under $10,000 would decrease from 55 percent in 1977 to 41 percent in 1990 and to 35 percent in 1995 according to the series 2-C projections (table 8-10). The corresponding percentages according to series 1-C and series 3-D for the year 1995 are 46 and 24. The proportion with an income over $35,000 would increase from 3.8 percent in 1977 to 7.5 percent in 1990 and 9.7 percent in 1995 according to series 2-C; the 1-C and 3-D variants in 1995 would show increases of 6.1 percent and 14.3 percent, respectively. Even with these relative reductions in low income elderly households and relative increases in high income elderly households, the corresponding proportions in 1995 will remain, respectively, well above and well below the corresponding figures for all family households.

The median income for family households with householders 65 years and over would increase from $9,129 in 1977 to $11,737 in 1990 (29 percent) and to $12,895 in 1995 (41 percent), in terms of 1977 purchasing power, according to series 2-C. The corresponding figures according to series 1-C and series 3-D for the year 1995 are $10,800 and $15,454, respectively. Younger households would continue to have far higher median incomes than elderly households; the relative excess of the median income for all households over elderly households is projected to be about 75 percent in 1995 (series 2-C), as it was in 1977.

In 1995, as in 1977, the incomes of nonfamily households will be concentrated near the lower end of the income range, with much larger percentages receiving incomes below $10,000, and much lower percentages receiving incomes over $35,000, than family households. The tendency for nonfamily households to concentrate at the lower end of the income scale is expected to be much less pronounced in 1995 than in 1977, however. For example, according to series 2-C, 79 percent of the nonfamily households would be receiving less than $10,000 income in 1995 as compared with 89 percent in 1977. Yet in 1995, the median income for family households is expected to remain well above (136 percent) that for nonfamily households.

Noncash benefits. To obtain a more complete picture of the income status of the elderly, "in-kind" income or noncash benefits should be added to money income received. Noncash benefits consist of goods or services obtained without any expenditure or at a rate below the market value of the goods or services. The most important public noncash benefits received currently by the elderly are Medicare, Medicaid, food stamps, and publicly owned or publicly subsidized housing. It has been estimated that public noncash benefits add about 10 percent to the income of elderly persons.[126] In addition to public noncash benefits, various noncash benefits are provided by employers or unions, such as pension plans and group health insurance plans, and by private businesses, such as discounts on prescriptions, bus fares, and theatre prices. Relatives and friends substantially supplement the incomes of older persons with noncash benefits (e.g., gifts) as well as money.

The Medicare program is designed to provide adequate medical care for the aged and disabled. It is financed through monthly premium payments made by each person enrolled and is subsidized by general Federal funds. A separate trust fund is maintained for the Medicare program by the U.S. Health Care Financing Administration. The Medicaid program is designed to provide medical assistance to needy families with dependent children and to aged, blind, and disabled individuals whose incomes or resources are insufficient to pay for necessary medical care. This program is administered by State agencies through grants from the Health Care Financing Administration.

The food stamp program is federally funded and is administered by the Food and Nutrition Service of the Department of Agriculture. Its major purpose is to provide low-income households with a nutritious diet. Persons participating in the program receive coupons to purchase food in retail stores. The value of the coupons received depends on both the income of the recipient and the number of persons in the family.

Public or subsidized housing programs are designed to assist low-income families and individuals in securing safe, sanitary housing. Partial financing is provided by the State or the Department of Housing and Urban Development. Participation in public housing is determined by program eligibility and availability of housing. Rental charges are determined by Federal statute not to exceed 25 percent of net monthly money income.

---

[124] U.S. Bureau of the Census, *Illustrative Projections of Money Income Size Distributions for Households: 1980 to 1995*, Current Population Reports, Series P-60, No. 122, March 1980.

[125] U.S. Bureau of the Census, *Projections of the Number of Households and Families: 1979 to 1995*, Current Population Reports, Series P-25, No. 805, May 1979.

[126] Marilyn Moon, *The Measurement of Economic Welfare: Its Application to the Aged Poor*, Academic Press, New York, 1977.

The four major programs described show different participation rates for elderly households. Except for Medicare, participation is relatively low. Nearly all elderly persons are covered by Medicare. Among households with elderly householders more than 9 in 10 (93 percent) had one or more members who were covered by Medicare in 1979 as compared with only 1 household in 4 (23 percent) for all households (table 8-11). One household in 6 with elderly householders was covered by Medicaid while only 1 household in 10 among all households was covered by this program. A very small percentage of households with elderly householders participated in the Food Stamp program (6 percent), a percentage close to that for all households. One could speculate that many of the elderly households were not well informed about the program or felt that participation in the program stigmatized them. Similarly, only a small percentage (5 percent) of elderly households resided in public or subsidized housing. The reasons for the small participation may be that such housing was scarce, the program was not popular, or potential participants may not have known about the program.

Whether the household was poor or not made no difference in the use of Medicare by elderly households. Some 93 percent of the poor households were enrolled in Medicare (table 8-11). Poverty greatly affected the resort to Medicaid, food stamps, and subsidized or public housing, however, as might be expected. Over one-third of elderly poor households benefited from Medicaid as compared with only 16 percent of all elderly households. Nearly one-quarter of the elderly poor households received food stamps as compared with only 6 percent of all elderly households. The comparable figures for subsidized housing were 12 percent and 5 percent.

Elderly poor households took much less advantage of the food stamp program than younger poor households (23 percent for elderly households vs. 37 percent for all households). The differences in the use of Medicaid and subsidized housing were much smaller.

ASSETS

In addition to receiving current income, many of the elderly own assets that provide housing, serve as financial reserves for special or emergency needs, and contribute directly to income through interest, dividends, and rents. In general, assets fall into three categories: liquid assets, illiquid assets, and home equity. Liquid assets include cash and savings or checking accounts. Illiquid assets consist of securities, equity in a business or a professional practice, real estate, insurance policies, and annuities. Ownership of a home constitutes home equity. Assets accumulated during the working years may provide a source of income to supplement a retired person's earnings and other (e.g., transfer) income. Thus, asset ownership is important in analyzing the financial position of the elderly.

Several studies conducted by the Social Security Administration deal with the contribution of assets to the income of the elderly. Of special interest in this regard is the Retirement History Study because of its longitudinal design and the wealth of data collected concerning the economic status of the elderly. On the basis of this study, it is possible to examine changes that occurred in the asset holdings of a sample cohort as the members of the cohort approached retirement, retired, and then lived into the post-retirement years. The sample consisted of married men, nonmarried men, and nonmarried women all of whom were 58 to 63 years old at the time of the first interview in 1969. These men and women were interviewed biennially through 1979. Several of the questions asked pertained to assets.

Two reports based on the data on assets obtained in the Retirement History Study were published, one prepared by S.R. Sherman and the other by Friedman and Sjogren.[127] Sherman found that asset ownership was common among those approaching retirement age but that the value of the assets owned was low, especially when home equity was excluded. Only a small fraction of respondents, mainly ones with high incomes, had substantial asset wealth.

The study by Friedman and Sjogren covered the 1969-75 period, a period during which a majority of the respondents retired. (There are no data available at the present time for 1979, the year when the study was in the last stage and by which almost all participants had retired.) At the start of the study about 9 out of 10 study participants (86 percent) owned some assets. Over the course of the survey, as the respondents aged and retired, the proportion owning assets shifted upward slightly (89 percent in 1975). (Table 8-12.) In 1975, the proportion of participants owning illiquid assets was relatively small (24 percent) as compared with the proportion owning either liquid assets (81 percent) or a home (69 percent).

Among the three marital-sex groups identified, the proportion of married men owning some type of assets in 1975 was higher (94 percent) than the proportion for nonmarried men or women (about 80 percent). Further, the proportion of persons owning each of the three types of assets was higher for married men than for nonmarried men or women. The difference between married men (82 percent), on the one hand, and nonmarried men (51 percent) or women (46 percent), on the other, was especially large with respect to home ownership. There was less difference between the proportions of nonmarried men (75 percent) and nonmarried women (73 percent) owning liquid assets and the proportion for married men (86 percent).

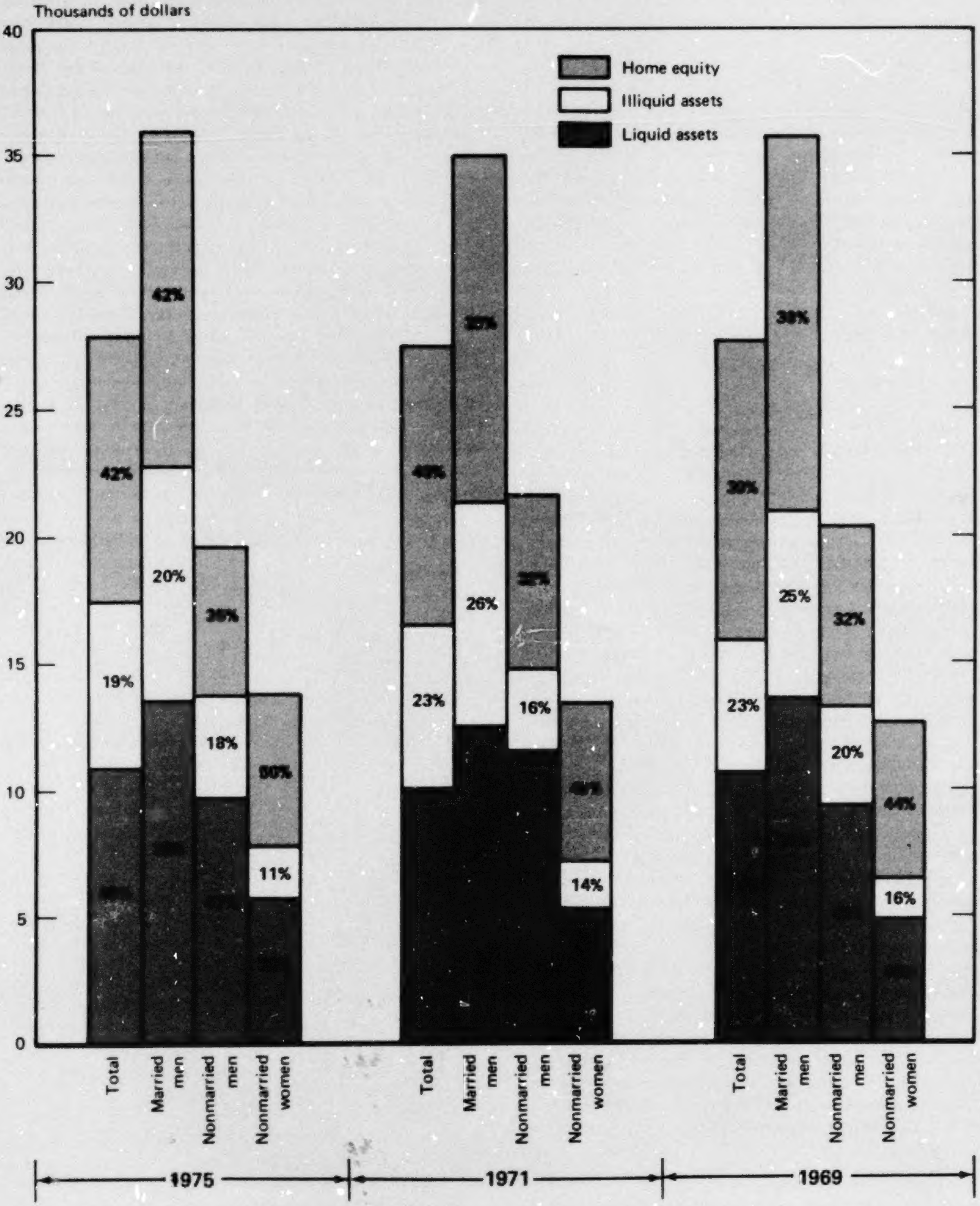
For homeowners, equity in their homes was the most important asset. Liquid assets ($10,719) and home equity ($11,740) comprised the largest components of the mean

---

[127] U.S. Social Security Administration, Office of Research and Statistics, "Assets on the Threshold of Retirement," by Sally R. Sherman, pp. 69-81 in Lola Irelan et al., *Almost 65: Baseline Data from the Retirement History Study* (Research Report No. 49), 1976, and Joseph Friedman and Jane Sjogren, "Assets of the Elderly as They Retire," *Social Security Bulletin*, Vol. 44, No. 1, January 1981 (Retirement History Study Report No. 23), pp. 1-16.

FIGURE 8-2.

Mean Assets of Retirement History Study Respondents and Percent Distribution of Mean Assets by Type of Assets, by Marital Status and Sex: 1975, 1971, and 1969



Source: Table 8-12.

total assets "portfolio" of the participants ($27,614) and represented approximately equal shares of total assets. Illiquid assets were the smallest component ($5,171); clearly few respondents owned appreciable amounts of illiquid assets.

The mean amount of total assets showed a small net decline between 1969 and 1975 (table 8-12). Illiquid assets declined markedly over this period, while liquid assets showed little net change and home equity increased substantially. For the respondents as a whole and for the individual marital-sex groups of respondents, the relative proportions of the three types of assets showed similar changes. The proportion of mean total assets represented by home equity rose from 39 percent to 42 percent between 1969 and 1975 (figure 8-2). The growth in the importance of home equity was particularly notable for nonmarried women homeowners, for whom the mean proportion increased from 44 percent to 50 percent.

EXPENDITURES

According to the 1972-73 Consumer Expenditure Survey, the latest source of appropriate information, shelter, food, transportation, and recreation are the leading items in family budgets, making up nearly four-fifths of the total budget (table 8-13).[128] For families with elderly householders, health care displaces recreation and the four largest categories become shelter, food, transportation, and health care. Together, these constitute over four-fifths of the total expenditures of elderly families, and each exceeds 10 percent of the total. Clothing, recreation, and personal care each contribute between 2 and 10 percent of the budget of elderly families. The other items in the budget are so small as to be interesting less for their importance in the budget than for the light they throw on the style of living of older persons.

The expenditure on housing constitutes the largest component of the total budget for both the under-65 families and the 65-and-over families. Further, the proportion of the budget spent on housing by the elderly (34 percent) was substantially higher than for younger age groups (30 percent). This is not because of large mortgage payments, since most elderly persons own their own homes. Rather, it is because the homes of the elderly are generally old and often in need of major repairs.

Families with householders 65 years old and over spent a slightly larger proportion of their budget on food (21 percent) than younger families (19 percent). (See table 8-13.) The most important reason for the relatively higher level of food expenditures is the fact that, when income is low, as it is for most elderly families, consumption expenditures tend to be low in absolute dollars, and expenditures for basic necessities take precedence in the budget. A possible additional reason is the smaller size of elderly families. There is some loss of economy of scale as family size decreases; the per-person expenditure of a family for various budget items tends to increase as the number of persons in the family decreases.

Expenditures for transportation (14 percent) are another important item in the budget of older persons. Surveys have shown, however, that the relative importance of transportation expenditures declines with increasing age.[129] The transportation expenditures of families with elderly householders constitute a much smaller proportion of the total budget than the transportation expenditures of families with younger householders (table 8-13). This results in part from the fact that retirement reduces or eliminates the costs of going to and from work. On the other hand, recreational travel may increase, particularly among the higher income groups. Finally, declining health and disability associated with aging may affect transportation needs and costs, presumably tending to raise them.

Contrary to expectation, elderly families spent a larger proportion of their budgets on transportation than health care. This is so because, although the total costs of health care were considerably higher for the elderly than the costs of transportation, the major part of the health bill was covered by Medicare or Medicaid payments.

SOCIETAL AGE AND ECONOMIC DEPENDENCY

Societal dependency ratios for the elderly represent essentially the relative burden of older "dependents," defined either by age or economic status, on "productive" persons, also defined either by age or economic status. When economic support by the community is considered, a relatively wide band of ages must be used to represent "producers." Age-dependency ratios, which relate the number of persons of dependent ages to the number of persons of productive ages, are intended to show how age composition contributes to economic dependency in a given population.

The age factor in the economic dependency of the elderly may be represented by the ratio of persons 65 years and over to persons 18 to 64 years (per 100). This ratio showed a steady rise in the earlier part of this century but is expected to level off or increase slowly in the next several decades. The ratio was 11 in 1940 and 19 in 1980; it is expected to rise to only 22 by the year 2010 (table 8-14). A sharp rise in the ratio is anticipated between 2010 and 2030 (29 in 2020 and 37 in 2030 under the middle series of projections) as the large postwar birth cohorts reach 65 years of age. These changes imply an increasing burden on the working-age population to support the older population, especially after 2010.

It may be maintained that the measurement of the dependency burden of the elderly should take into account the level of the child-dependency ratio since the share of society's product available for the elderly is affected by the level of child dependency. The relative numbers of children and persons of the principal working ages fell sharply between 1970 and 1980.

---

[128] U.S. Department of Labor, Bureau of Labor Statistics, *Consumer Expenditure Survey: Integrated Diary and Interview Survey Data, 1972-73*, Bulletin 1992, 1978. The Consumer Expenditure Survey for 1980-82 has just been completed, but it has not been possible to incorporate the results.

[129] John Reinecke, "Expenditures of Two-Person Unit and Individuals After Age 55," Staff Paper No. 9, U.S. Social Security Administration, Office of Research and Statistics, 1971.

Year	Dependency ratios (middle series)		
	Child[1]	Aged[2]	Total[3]
1970[4]	61	18	78
1980[4]	46	19	65
1990.	42	21	63
2000.	41	21	62
2010.	36	22	58
2020.	37	29	66
2030.	38	37	75

[1] Ratio of population under 18 years to population 18 to 64 years per 100.

[2] Ratio of population 65 years and over to population 18 to 64 years per 100.

[3] Sum of child and aged dependency ratios.

[4] Actual values.

Source: Based on U.S. Bureau of the Census, Current Population Reports, Series P-25, Nos. 519, 614, 917, and 922; also unpublished records consistent with P-25, No. 922.

The child-dependency ratio, the number of children under age 18 per 100 persons 18 to 64 years, declined from 61 in 1970 to 46 in 1980. It is expected to continue this downward course to about 36 in 2010 and then show a modest recovery to about 38 in 2030 (under the middle series of projections). These changes imply a generally decreasing burden on the working-age population to support the child population.

The combination of child dependency and aged dependency, representing the overall dependency burden on the working-age population, showed a sharp decline between 1970 and 1980 (from 78 to 65) but is expected to show only a modest further decline in the next few decades (to 62 in 2000 and 58 in 2010 under the middle series). In the subsequent years from 2010 to 2030, the overall dependency burden will rise sharply (to 75 in 2030) as the baby-boom cohorts move into the 65-and-over ages. Slower growth of the child population in the next few decades will permit the conversion of some funds and facilities from use by children to the support of the elderly. However, the support costs for older persons are greater than for children and tend to become public responsibilities as compared with the support costs of children, which tend to be private family responsibilities.[130]

Measures relating older nonworkers to workers may be viewed as more realistic for measuring the economic dependency of the older population than age-dependency ratios. The ratio of (noninstitutional) nonworkers aged 60 years and over to workers 20 to 59 years of age can be examined for this purpose:

Year	Economic dependency ratios (per 100)	Year	Economic dependency ratios (per 100)
Estimates:		Projections:[1]	
1940.	[2] 20	1980.	29 (29-29)
1950.	[2] 24	1981.	28 (29-28)
1960.	[3] 28	1985.	29 (30-27)
1970.	[3] 28	1990.	29 (31-27)
1980.	[3] 29	1995.	28 (31-26)
1981.	[3] 29	2000.	28 (30-26)

[1] Figures in parentheses represent low and high series of labor force projections in that order. Projections are available only to the year 2000.

[2] Census data for April 1.

[3] Labor force data are monthly averages based on or consistent with the Current Population Survey.

Source: Based on U.S. Bureau of the Census, Current Population Reports, Series P-25, Nos. 321, 519, and 922; *Census of Population, 1960, 1970,* and *1980;* U.S. Bureau of Labor Statistics, *Employment and Earnings,* Vol. 27, No. 1, January 1980, and Vol. 29, No. 1, January 1982; and U.S. Dept. of Labor, *Monthly Labor Review,* Vol. 103, No. 12, December 1980.

This series showed a marked increase between 1940 and 1980, especially between 1940 and 1960. In 1980, there were 29 nonworkers aged 60 and over per 100 workers aged 20 to 59, as compared with 20 in 1940. The series is expected to change little between now and the year 2000 (middle series), just like the series of societal aged dependency ratios.

In general, the difference between an economic dependency ratio and the corresponding age-dependency ratio represents largely the net contribution of nonworkers in the working ages to economic dependency. More exactly, the difference reflects the extent to which persons of "working age" are nonworkers and to which persons of "nonworking age" are workers. These adjustments will largely balance out for males, but since the dependency-support problem cuts across the sexes and nonworking women are very numerous at the working ages, economic-dependency ratios tend to be higher than aged-dependency ratios. Although the economic-dependency ratio allows for the effect of labor force participation, it excludes the effect of several other factors directly affecting the economic product available for supporting the dependent population, i.e., employment status, weeks worked in a year, hours worked in a week, and productivity (product per person hour). It also excludes the economic contribution of homemakers in rearing children and managing the affairs of the home and of volunteer workers. It should be possible to calculate the economic dependency ratio on the basis of full-time equivalents of employed persons.

---

[130] James H. Schulz, *The Economics of Aging,* Wadsworth Publishing Company, Belmont, California, 1980; and Robert L. Clark and Joseph J. Spengler, "Changing Dependency and Dependency Costs: The Implications of Future Dependency Ratios and Their Composition," pp. 55-89 in Barbara R. Herzog (ed.), *Aging and Income: Programs and Prospects for the Elderly,* Human Sciences Press, New York, 1978.

It may be maintained that the concepts of age dependency and even economic dependency of the elderly will become increasingly less significant as more and more workers participate in effective public and private pension plans in addition to the Federal Social Security retirement program. Participation in these plans would provide the extra measure of security needed to supplement the rather meager allowances under the Social Security program.

DEMOGRAPHIC AND OTHER FACTORS IN SOCIAL SECURITY FUNDING

Participation in any pension plan by workers involves a postponement of current satisfaction of goods and services so that they have a claim on goods and services at a future period when they retire. This claim may be gradually augmented by an adjustment for inflation and for interest on the basis of the current market interest rate. If the system is actuarially sound and is managed as an insurance program, benefits will be actuarially determined in relation to premiums on the basis of the risk experience of the particular population group (i.e., defined by age, sex, and other characteristics) and the need for an adequate reserve. The typically long time-lag between payment of contributions and receipt of benefits, with the likelihood of severe price fluctuations in the interim, complicates the funding task.

The combined annual contributions to a retirement trust fund, the total size of the retirement trust fund, and the reserves should reflect the changing size of the cohorts of contributors. Large elderly cohorts will have made larger total contributions to the fund when they worked than small cohorts, and hence, a larger fund should be available to provide benefits to them. This applies both to job-specific funds and the Social Security trust fund. (Larger cohorts will also have saved larger sums collectively in pursuance of their own "personal" retirement plans.)

The Social Security retirement program is not essentially an insurance program, however; it has many elements of a welfare program. Furthermore, at present, current workers and taxpayers largely contribute the funds needed to pay benefits to retired persons. Since the program is a combination of a welfare system and an insurance system and since it is financed essentially on a pay-as-you-go basis, a principal demographic factor affecting Social Security funding is the fluctuations in the sizes of the population of "contributing ages" and the population of "beneficiary ages" and the resulting shifts in the relative size of the two groups. These shifts can be closely measured only for the next few decades inasmuch as future fertility changes begin to affect the balance after this period. The rise in the beneficiary/contributor ratio places an increasing strain on the system unless contributions, benefits, and reserves are structured to allow for and anticipate the shifts or unless there are modifications in the contributor and/or beneficiary universe.

These facts justify the use of dependency ratios to reflect the economic burden of the older segment of the population on the younger segment. The situation can be rationalized by a possible ethical inference that each generation has an obligation to support the previous generation. Questions of the feasibility of providing the economic support and of intergenerational equity arise when the older population is very large in relation to the working-age population, as it will be, for example, in the years 2010-30.

In addition to the changing size of birth cohorts and their relative numbers, other demographic changes which have implications for the funding of a pension system, particularly a national system like Social Security, include shifts in life expectation, changes in the length of working life and in labor force participation ratios, and shifts in employment ratios and in the balance of full and part-time work.[131] In recent decades, increases in life expectation, a rising age of entry into the labor force, and a rise in the proportion of persons receiving retirement benefits at ages below the "normal" retirement age have extended the period during which participants in a retirement plan draw money from the fund and reduced the period during which they contribute to it.[132] The increased years of life have gone into additional years of leisure rather than increased years of work.

The high level of unemployment and underemployment (including reduced weeks of work per year and reduced hours of work per week) associated with the present stagnant condition of the economy has also intensified the current problem of maintaining the solvency of the Social Security Trust Fund. On the other hand, the rise in labor force participation of women has worked to reduce it. The effect of this latter factor may diminish and even reverse itself, however, as working women reach retirement age in large numbers and begin to draw from the fund in their own right, and as the female labor reserve contracts.

These trends need to be considered when decisions are being made about the level of worker contributions, including both the rate of contributions and the income base for requiring them. The welfare features of the Social Security retirement system, the wide range of public services provided to the elderly, and the persistence of inflation, which only recently was soaring and has precipitated the adjustments of benefits for cost-of-living increases, have created special demands on the retirement system. On the other hand, the effect of inflation on benefits is offset in part by the increase in the contributions of workers to the fund as a result of inflation.[133]

Prospective demands on the Social Security Trust Fund can be financially covered by extending the period of

---

[131] President's Commission on Pension Policy, "Demographic Shifts and Projections: The Implications for Pension Systems," by Barbara Boyle Torrey, *Working Papers*, 1980.

[132] James N. Morgan, "Welfare Economic Aspects of Prolongation of Life," *Congress Abstracts*, Vol. I, 10th International Congress of Gerontology, Jerusalem, Israel, June 22-27, 1975, pp. 25-27.

[133] Simler and Tella, *op. cit.*

"mandatory" work before retirement (i.e., by raising the normal age of retirement), reducing benefits for early retirement, providing inducements for continuing work voluntarily before and after retirement, raising general taxes, taxing benefits, eliminating minimum benefits, expanding the universe of potential contributors to include Federal, State, and local workers on a mandatory basis, imposing a higher tax rate on worker earnings, or applying the tax rate to a broader income base.[134] The most "painless" solution would be a voluntary rise in the typical age at retirement to be achieved in part by expansion of the opportunities for productive work on the part of the elderly. This solution cannot be depended upon, however, and may have adverse "side-effects," such as slowing down the rate of advancement through the work organization and discouraging the employment of youth. A mandatory rise in the normal age of retirement would appear to be more a dependable solution. It may be justified on the ground that, since the Social Security system was established in 1935, increased life expectancy has greatly extended the period for receiving benefits and, in combination with falling fertility, has greatly increased the ratio of beneficiaries to contributors. All of these approaches should be considered in order to plan ahead for and deal constructively with the "crunch" expected in retirement systems in the early part of the next century, when the baby-boom cohorts reach the ages of retirement.

Because of the difficulties of anticipating and controlling the total consumption requirements and work practices of the elderly, the levels of longevity and fertility of the population, and the level of inflation and because of the prospective sharp rise in the aged dependency ratio, a gradual rise in the normal age of retirement and subsidies from the current crop of workers (i.e., intergenerational transfers) through an increase in payroll contributions (as has recently occurred) and/or general taxation will probably be necessary. In addition, benefits may have to be reduced by taxation of benefits or elimination of minimum benefits, at least for some higher income categories of beneficiaries.

Changes in the age distribution of the population may become the dominant factor affecting the condition of the Social Security Trust Fund when the baby-boom cohorts come of age, but in the nearer future the slow increase in the relative size of the older population and the working-age population will not in itself greatly strain the fund. During this earlier period, other factors are expected to have a more dominant effect on the solvency of the fund. This period provides an opportunity to prepare for and avert a crisis in politico-economic planning and intergenerational relationships.

---

[134] Torrey, *op. cit.* See also President's Commission on Pension Policy, "Varieties of Retirement Ages," by Elizabeth L. Meier and Cynthia C. Dittmar, *Working Papers*, January 1980.

Table 8-1. Labor Force Participation Ratios, for the Population 55 Years and Over, by Age, Race, and Sex: 1955 to 2000

(Figures are monthly averages. Total noninstitutional population. Projections are based on current labor force participation ratios through 1979 and current population estimates through 1976. See text for explanation of alternative "low" and "high" series of projections shown in parentheses below the "middle" figures).

Age, race, and sex	1955	1960	1965	1970	1975	1981	1985	1990	1995	2000
ALL CLASSES										
Male										
55 to 64 years	87.9	86.8	84.7	83.0	75.8	70.8	69.7	67.5	66.5	66.6
Range	(X)	(X)	(X)	(X)	(X)	(X)	(65.8-72.4)	(60.7-72.2)	(57.8-72.8)	(56.9-73.8)
55 to 59 years	92.5	91.6	90.2	89.5	84.4	81.3	80.2	78.7	77.6	77.0
Range	(X)	(X)	(X)	(X)	(X)	(X)	(77.5-82.2)	(74.2-82.4)	(71.7-82.7)	(70.2-83.0)
60 to 64 years	82.5	81.2	78.0	75.0	65.7	58.7	58.5	55.9	53.9	52.8
Range	(X)	(X)	(X)	(X)	(X)	(X)	(53.2-61.7)	(46.9-61.7)	(41.9-61.6)	(39.3-61.6)
65 years and over	39.6	33.1	27.9	26.8	21.7	18.5	17.5	15.8	14.3	13.2
Range	(X)	(X)	(X)	(X)	(X)	(X)	(16.1-19.7)	(13.3-19.6)	(11.0-19.2)	(9.6-18.7)
65 to 69 years	57.0	46.8	43.0	41.6	31.7	27.8	25.9	23.2	21.1	19.9
Range	(X)	(X)	(X)	(X)	(X)	(X)	(24.3-29.6)	(20.4-29.6)	(17.3-29.6)	(15.8-29.6)
70 years and over	28.1	24.4	19.1	17.7	15.1	12.6	12.3	11.3	10.5	9.8
Range	(X)	(X)	(X)	(X)	(X)	(X)	(11.0-13.6)	(9.0-13.5)	(7.5-13.5)	(6.5-13.2)
Female										
55 to 64 years	32.5	37.2	41.1	43.0	41.0	41.5	41.6	41.7	42.3	43.0
Range	(X)	(X)	(X)	(X)	(X)	(X)	(40.9-42.6)	(40.3-43.4)	(40.6-44.5)	(41.1-45.4)
55 to 59 years	35.6	42.2	47.1	49.0	47.9	49.9	49.3	49.7	50.0	50.2
Range	(X)	(X)	(X)	(X)	(X)	(X)	(49.1-49.5)	(49.4-50.1)	(49.6-50.5)	(49.8-50.9)
60 to 64 years	29.0	31.4	34.0	36.1	33.3	32.7	33.8	33.8	33.8	33.7
Range	(X)	(X)	(X)	(X)	(X)	(X)	(32.4-35.6)	(31.4-36.8)	(30.6-37.8)	(30.1-38.5)
65 years and over	10.6	10.8	10.0	9.7	8.3	8.1	7.7	7.3	6.8	6.4
Range	(X)	(X)	(X)	(X)	(X)	(X)	(7.4-7.9)	(7.0-7.9)	(6.6-7.6)	(6.2-7.3)
65 to 69 years	17.8	17.6	17.4	17.3	14.5	14.9	14.6	14.1	13.8	13.6
Range	(X)	(X)	(X)	(X)	(X)	(X)	(14.5-14.9)	(13.9-14.9)	(13.5-14.9)	(13.2-14.9)
70 years and over	6.4	6.8	6.1	5.7	4.9	4.6	4.3	4.0	3.8	3.6
Range	(X)	(X)	(X)	(X)	(X)	(X)	(3.9-4.5)	(3.7-4.5)	(3.6-4.5)	(3.5-4.3)
BLACK AND OTHER RACES										
Male										
55 to 64 years	83.1	82.5	78.8	79.2	68.7	63.2	62.7	59.6	57.4	56.8
Range	(X)	(X)	(X)	(X)	(X)	(X)	(60.8-67.9)	(56.4-68.8)	(53.4-70.0)	(52.4-72.1)
55 to 59 years	(NA)	(NA)	(NA)	83.5	76.9	72.0	70.8	68.0	65.9	64.8
Range	(X)	(X)	(X)	(X)	(X)	(X)	(70.1-77.0)	(66.9-79.0)	(64.6-81.3)	(63.2-83.6)
60 to 64 years	(NA)	(NA)	(NA)	73.6	59.3	52.[illegible]	53.3	50.2	47.8	46.6
Range	(X)	(X)	(X)	(X)	(X)	(X)	(50.0-57.3)	(44.7-57.4)	(40.5-57.3)	(38.7-57.4)
65 years and over	40.0	31.2	27.9	27.4	20.9	16.8	16.2	14.0	12.3	11.2
Range	(X)	(X)	(X)	(X)	(X)	(X)	(15.1-19.1)	(12.2-19.1)	(9.9-19.1)	(9.3-18.7)
65 to 69 years	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	24.2	21.0	18.5	17.2
Range	(X)	(X)	(X)	(X)	(X)	(X)	(21.9-28.5)	(16.9-28.5)	(13.3-28.6)	(13.2-28.5)
70 years and over	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	11.1	9.4	8.3	7.6
Range	(X)	(X)	(X)	(X)	(X)	(X)	(10.8-13.1)	(9.1-12.8)	(7.7-13.0)	(7.0-12.9)
Female										
55 to 64 years	40.7	47.3	48.9	47.1	43.8	44.9	43.9	43.8	43.9	44.3
Range	(X)	(X)	(X)	(X)	(X)	(X)	(43.2-45.3)	(42.7-46.2)	(42.5-47.0)	(42.7-47.8)
55 to 59 years	(NA)	(NA)	(NA)	53.4	52.1	50.8	50.4	50.4	50.4	50.4
Range	(X)	(X)	(X)	(X)	(X)	(X)	(50.4-51.7)	(50.3-52.6)	(50.3-53.2)	(50.2-53.5)
60 to 64 years	(NA)	(NA)	(NA)	39.0	34.6	37.9	36.5	36.5	36.5	36.5
Range	(X)	(X)	(X)	(X)	(X)	(X)	(35.2-38.0)	(34.4-39.2)	(33.7-40.1)	(33.3-40.6)
65 years and over	12.1	12.8	12.9	12.2	10.5	9.3	9.7	9.2	8.6	8.2
Range	(X)	(X)	(X)	(X)	(X)	(X)	(9.0-9.9)	(8.5-9.8)	(8.1-9.6)	(7.8-9.3)
65 to 69 years	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	17.1	16.7	16.2	16.1
Range	(X)	(X)	(X)	(X)	(X)	(X)	(17.1-16.8)	(16.7-16.7)	(16.2-16.8)	(16.1-16.8)
70 years and over	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	5.2	4.7	4.4	4.2
Range	(X)	(X)	(X)	(X)	(X)	(X)	(4.1-5.7)	(3.6-5.7)	(3.6-5.6)	(3.5-5.5)

NA Not available. X Not applicable.

Source: Estimates from the U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Vol. 22, No. 7, January 1976, Vol. 27, No. 1, January 1980, and Vol. 29, No. 1, January 1982; and projections from the Monthly Labor Review, Vol. 103, No. 12, December 1980, and unpublished data.

Table 8-2. Estimated and Projected Number of Persons in the Labor Force 55 Years and Over, by Sex and Broad Age Groups: 1981, 1990, and 2000

(Numbers in thousands. Total noninstitutional population. Base year for labor force projections is 1979)

Age, sex, and series	1981[1]	1990	2000	Percent change 1981-2000	Percent change 1981-1990	Percent change 1990-2000
MIDDLE SERIES						
Male						
55 to 64 years	7,091	6,626	7,329	+3.4	-6.6	+10.6
55 to 59 years	4,365	3,923	4,825	+10.5	-10.1	+23.0
60 to 64 years	2,726	2,703	2,504	-8.1	-0.8	-7.4
65 years and over	1,850	1,826	1,612	-12.9	-1.3	-11.7
Female						
55 to 64 years	4,644	4,476	5,160	+11.1	-3.6	+15.3
55 to 59 years	2,919	2,650	3,374	+15.6	-9.2	+27.3
60 to 64 years	1,725	1,826	1,786	+3.5	+5.9	-2.2
65 years and over	1,158	1,225	1,145	-1.1	+5.8	-6.5
HIGH SERIES						
Male						
55 to 64 years	7,091	7,091	8,116	+14.5	-	+14.5
55 to 59 years	4,365	4,109	5,196	+19.0	-5.9	+26.5
60 to 64 years	2,726	2,982	2,920	+7.0	+9.4	-2.1
65 years and over	1,850	2,263	2,280	+23.2	+22.3	+0.8
Female						
55 to 64 years	4,644	4,662	5,459	+17.5	+0.4	+17.1
55 to 59 years	2,919	2,671	3,419	+17.1	-8.5	+28.0
60 to 64 years	1,725	1,991	2,040	+18.3	+15.4	+2.5
65 years and over	1,158	1,319	1,300	+12.3	+13.9	-1.4
LOW SERIES						
Male						
55 to 64 years	7,091	5,964	6,260	-11.7	-15.9	+5.0
55 to 59 years	4,365	3,699	4,399	+0.8	-15.3	+18.9
60 to 64 years	2,726	2,265	1,861	-31.7	-16.9	-17.8
65 years and over	1,850	1,539	1,174	-36.5	-16.8	-23.7
Female						
55 to 64 years	4,644	4,330	4,939	+6.4	-6.8	+14.1
55 to 59 years	2,919	2,634	3,344	+14.6	-9.8	+27.0
60 to 64 years	1,725	1,696	1,595	-7.5	-1.7	-6.0
65 years and over	1,158	1,178	1,109	-4.2	+1.7	-5.9

[1] Actual estimates.

Source: Estimates from the U.S. Department of Labor, Employment and Earnings, Vol. 29, No. 1, January 1982, and projections from Monthly Labor Review, Vol. 103, No. 12, December 1980, and unpublished data.

Table 8-3. Percentage of Insured Workers 62 Years and Over With OASDI Benefits in Current-Payment Status, by Age Group and Sex: Selected Years, 1965 to 1981

(Insured workers represent those with sufficient "quarters of coverage" to meet the eligibility requirements for retired-worker or disabled-worker benefits)

Year (January 1)	62 to 64 years			65 years and over[1]		
	Total	Retired	Disabled	Total	65 to 71	72 and over
Both sexes:						
1981	56	43	13	93	89	97
1980	55	42	13	93	89	99
1975	50	39	11	93	87	99
1970	39	31	8	90	80	100
1965	38	32	6	89	80	100
1960	(2)	(2)	(2)	85	76	92
Male:						
1981	54	38	15	95	91	100
1980	52	36	16	95	90	100
1975	46	33	13	93	87	100
1970	34	24	10	90	79	100
1965	32	25	7	89	79	100
1960	(2)	(2)	(2)	84	73	97
Female:						
1981	59	49	10	91	88	99
1980	59	49	10	91	88	99
1975	56	48	8	92	86	99
1970	46	40	6	90	81	99
1965	47	44	4	89	80	100
1960	44	42	2	87	82	96

[1] At age 65, disabled-worker benefits are converted to retired-worker benefits.
[2] Retired-worker benefits (actuarially reduced) were first payable at ages 62-64 to women in 1956 and to men in 1961.

Source: Social Security Administration, Social Security Bulletin, Annual Statistical Supplement, 1980, table 46.

Table 8-4. Median Income of Families With Householders 65 Years and Over, by Type of Family and Race of Householder, and of Unrelated Individuals 65 Years and Over, by Race and Sex: 1950 to 1980

Race and year	Total	Families				Unrelated individuals		
		Total	Married couples	Male householder, no wife present	Female householder, no husband present	Total	Male	Female
HOUSEHOLDER 65 YEARS AND OVER								
All Races								
1980	$12,882	$12,965	$12,951	$13,342	$12,285	$5,096	$5,746	$4,957
1975	8,057	8,023	7,965	10,573	8,311	3,311	3,692	3,235
1970	5,053	5,011	4,966	6,722	5,370	1,951	2,250	1,888
1965[1]	3,514	(NA)	(NA)	(NA)	(NA)	1,378	(NA)	(NA)
1960	2,897	2,857	2,813	4,063	3,139	1,053	1,313	960
1950	1,903	(NA)	(NA)	(NA)	(NA)	646	(NA)	(NA)
White								
1980	$13,382	$13,338	$13,306	$14,279	$13,744	$5,354	$6,166	$5,186
1975	8,346	8,226	8,146	11,438	9,267	3,415	3,924	3,333
1970	5,263	5,177	5,107	7,320	5,909	2,005	2,365	1,937
Black								
1980	$8,383	$8,576	$8,510	$9,039	$7,966	$3,718	$4,848	$3,558
1975	5,293	5,564	5,376	(B)	4,877	2,365	2,603	2,301
1970	3,282	3,393	3,359	(B)	2,878	1,443	1,708	1,357
ALL FAMILIES OR UNRELATED INDIVIDUALS								
All Races								
1980	$21,023	$22,929	$23,141	$17,519	$10,408	$8,296	$10,939	$6,668
1975	13,719	14,816	14,867	12,752	6,844	4,882	6,612	3,978
1970	9,867	10,480	10,516	9,012	5,093	3,137	4,540	2,483
1965[1]	6,957	7,310	7,330	6,515	3,535	2,153	3,194	1,767
1960	5,620	5,857	5,873	4,860	2,968	1,720	2,480	1,377
1950	3,319	3,435	3,446	3,115	1,922	1,045	1,539	846
White								
1980	$21,904	$23,332	$23,501	$18,731	$11,908	$8,763	$11,679	$6,932
1975	14,268	15,094	15,125	13,793	7,651	5,099	7,061	4,188
1970	10,236	10,697	10,723	9,524	5,754	3,283	4,864	2,615
Black								
1980	$12,674	$18,076	$18,593	$12,557	$7,425	$5,394	$7,196	$4,011
1975	8,779	11,389	11,526	8,955	4,898	3,287	4,585	2,698
1970	6,279	7,766	7,816	6,751	3,576	2,117	3,320	1,651
RATIO, HOUSEHOLDER 65 YEARS AND OVER TO ALL FAMILIES OR UNRELATED INDIVIDUALS								
All Races								
1980	0.613	0.565	0.560	0.762	1.180	0.614	0.525	0.743
1975	0.587	0.542	0.536	0.829	1.214	0.678	0.558	0.813
1970	0.512	0.478	0.472	0.746	1.054	0.622	0.496	0.760
1965[1]	0.505	(NA)	(NA)	(NA)	(NA)	0.640	(NA)	(NA)
1960	0.515	0.488	0.480	0.836	1.058	0.612	0.529	0.697
1950	0.573	(NA)	(NA)	(NA)	(NA)	0.618	(NA)	(NA)
White								
1980	0.611	0.582	0.575	0.762	1.154	0.611	0.528	0.748
1975	0.585	0.545	0.539	0.829	1.211	0.670	0.556	0.796
1970	0.516	0.484	0.476	0.769	1.027	0.611	0.486	0.741
Black								
1980	0.661	0.474	0.458	0.720	1.073	0.689	0.674	0.887
1975	0.603	0.489	0.466	(X)	0.996	0.720	0.568	0.853
1970	0.523	0.437	0.430	(X)	0.805	0.682	0.514	0.825

B Base less than 75,000.   NA Not available.   X Not applicable.

[1] Based on revised median income.

Source: U.S. Bureau of the Census, Current Population Reports, Series P-60, Nos. 9, 37, 59, 97, 108, and 132.

Table 8-5. Income Per Person Based on Median Income of Families, for All Families and Families With Householders 65 Years and Over, by Type of Family and Race of Householder: 1960 to 1980

(Persons as of March 1981, March 1976, March 1971, and March 1961)

Race and year	Total families	Married-couple families	Other families	
			Male householder	Female householder
HOUSEHOLDER 65 YEARS AND OVER				
All Races				
1980	$5,505	$5,705	$4,748	$4.671
1975	3,385	3,448	3.873	3,044
1970	2,088	2,131	2.263	2,004
1960	(NA)	1,141	(NA)	(NA)
White				
1980	$5,862	$5,994	$5.211	$5.454
1975	3,629	3,620	4,316	3,606
1970	2.230	2.220	2,624	2.308
Black				
1980	$2,881	$3,039	(B)	$2.570
1975	1,659	1,768	(B)	1,397
1970	1,049	1.183	(NA)	834
ALL FAMILIES				
All Races				
1980	$6,390	$6,928	$6,394	$3.368
1975	4,011	4,284	4,367	2,132
1970	2,726	2,858	3,055	1,548
1960	1,531	1,558	1,723	939
White				
1980	$6,781	$7,143	$6,989	$4,149
1975	4,246	4,422	4,857	2.576
1970	2,892	2,962	3.438	1,931
Black				
1980	$3,453	$4,945	$4,214	$2,051
1975	2,251	2,911	2,689	1,269
1970	1.457	1.789	1,713	847
RATIO, HOUSEHOLDER 65 YEARS AND OVER TO ALL FAMILIES				
All Races				
1980	0.862	0.823	0.743	1.387
1975	0.844	0.805	0.887	1.428
1970	0.766	0.746	0.741	1.295
1960	(NA)	0.732	(NA)	(NA)
White				
1980	0.866	0,839	0.746	1.315
1975	0.855	0.819	0.889	1.400
1970	0.771	0.749	0.763	1.195
Black				
1980	0.834	0.615	(X)	1.253
1975	0.737	0.607	(X)	1.101
1970	0.720	0.661	(NA)	0.985

B Base less than 75,000. NA Not available. X Not applicable.

Source: Based on U.S. Bureau of the Census, Current Population Reports, Series P-20, Nos. 33, 106, 173, 218, 276, 287, and Series P-60, Nos. 9, 37, 59, 97, 105, and 132.

Table 8-6. Income Distribution of "Elderly" Families According to Work Status of Householder: 1980

Work experience in 1980	Median income (dollars)	Percent	Less than $5,000	$5,000 to $9,999	$10,000 to $14,999	$15,000 to $24,999	$25,000 or more
Householder did not work	$11,550	100.0	9.3	32.0	24.6	21.7	12.3
Householder worked part time:							
26 weeks or less	$13,250	100.0	6.7	28.3	21.1	25.4	18.5
27 to 52 weeks	$15,978	100.0	3.5	19.4	23.5	30.3	23.3
Householder worked full time:							
26 weeks or less	$14,763	100.0	1.6	15.9	34.5	21.8	26.2
27 to 52 weeks	$24,280	100.0	1.3	7.6	13.6	29.3	48.2

Source: U.S. Bureau of the Census, unpublished table prepared in connection with the report, *Money Income of Households, Families, and Persons in the United States: 1980*, Current Population Reports, Series P-60, No. 132, July 1982.

Table 8-7. Family Status and Race of Persons 65 Years and Over Below the Poverty Level: 1959 to 1981

(Numbers in thousands. Persons as of March 1982, March 1976, March 1971, March 1967, and April 1960)

Family status and race	Number below poverty level					Percent below poverty level				
	1981	1975	1970	1966	1959	1981	1975	1970	1966	1959
All persons 65 years and over	3,853	3,317	4,793	5,114	5,481	15.3	15.3	24.6	28.5	35.2
In families	1,432	1,191	2,013	2,507	3,187	8.4	8.0	14.8	19.2	26.9
Householder	851	728	1,188	1,450	1,787	9.0	8.9	16.5	20.9	29.1
Male	631	585	960	1,218	1,507	8.0	8.3	15.9	20.9	29.1
Female	220	143	209	231	280	14.8	12.7	20.1	20.4	28.8
Other family members	581	463	825	1,057	1,400	5.0	7.0	13.0	17.2	24.6
Unrelated individuals	2,421	2,125	2,779	2,607	2,294	29.8	31.0	47.2	53.8	61.9
Male	395	410	549	563	703	23.5	27.8	38.9	44.5	59.0
Female	2,026	1,716	2,230	2,044	1,591	31.4	31.9	49.8	57.0	63.3
White	2,978	2,634	4,011	4,357	4,744	13.1	13.4	22.6	26.4	33.1
Black	820	652	735	722	711	39.0	36.3	47.7	55.1	62.5

Source: U.S. Bureau of the Census, Current Population Reports, Series P-60, Nos. 86, 91, 124, and unpublished data.

Table 8-8. Family Householders and Unrelated Individuals 65 Years and Over Below the Poverty Level, by Race and Sex: 1981

(Numbers in thousands. Noninstitutional population as of March 1982. The definition of poverty used for 1981 differs slightly from that used in previous Current Population Reports. For details, see the source listed below)

Family status and sex	All races			White			Black		
	Total	Below poverty level		Total	Below poverty level		Total	Below poverty level	
		Number	Percent		Number	Percent		Number	Percent
Family householders	9,403	851	9.0	8,511	611	7.2	763	227	29.7
Male	7,916	631	8.0	7,278	458	6.4	521	152	29.2
Female	1,487	220	14.8	1,233	142	11.5	243	75	30.9
Unrelated individuals	8,134	2,421	29.8	7,267	1,929	26.5	792	466	58.8
Male	1,684	395	23.5	1,410	278	19.7	235	108	46.0
Female	6,450	2,026	31.4	5,857	1,651	28.2	557	358	64.3

Source: U.S. Bureau of the Census, *Money Income and Poverty Status of Families and Persons in the United States: 1981*, Current Population Reports, Series P-60, No. 134, July 1982, and unpublished data.

Table 8-9. Percent Distribution by Source of Income, and Median Income, for Families With Householders 65 Years and Over and All Families, and for Unrelated Individuals 65 Years and Over and All Unrelated Individuals: 1980

(Limited to money income)

Source of income	Percent of total						Median income			
	Families and unrelated individuals		Families		Unrelated individuals		Families		Unrelated individuals	
	Householders 65 and over	All householders	Householders 65 and over	All householders	Individuals 65 and over	All individuals	Householders 65 and over	All householders	Individuals 65 and over	All individuals
Total[1]	100.0	100.0	100.0	100.0	100.0	100.0	$12,882	$21,023	$5,096	$8,296
Earnings only	0.7	15.0	0.6	13.1	0.7	19.3	(B)	17,146	(B)	9,526
Wage or salary only	0.6	13.2	0.5	11.2	0.7	17.9	(B)	17,569	(B)	9,557
Self-employment income only	0.1	0.7	0.1	0.6	-	1.0	(B)	11,197	(B)	8,683
Wage or salary and self-employment income	-	1.1	-	1.4	-	0.4	(B)	15,928	(B)	9,983
Earnings and income other than earnings	30.1	65.5	44.2	73.7	13.8	46.9	17,716	24,261	8,528	12,403
Wage or salary and other income	24.3	55.7	35.4	61.4	11.6	42.9	17,500	24,248	8,471	12,419
Nonfarm self-employment income and other income	2.6	2.2	3.5	2.3	1.6	2.0	18,002	19,207	8,144	11,217
Farm self-employment income and other income	0.9	0.[illegible]	1.4	0.6	0.3	0.2	10,939	10,529	(B)	(B)
Wage or salary, self-employment and other income	2.1	6.8	3.6	9.1	0.3	1.7	22,829	25,763	(B)	15,379
Other combinations	0.2	0.3	0.3	0.4	0.1	-	(B)	23,032	(B)	(B)
Other income only	69.3	19.5	55.1	13.2	85.5	33.8	10,237	8,697	4,813	4,624
Social Security income only	9.7	2.4	5.5	1.1	14.6	5.4	5,812	5,695	3,655	3,605
Public assistance income only	-	1.2	-	1.5	0.1	0.6	(B)	3,791	(B)	2,383
Pension income only	0.1	0.1	0.2	0.1	0.2	0.2	(B)	(B)	(B)	(B)
Pension and property income only	1.0	0.4	0.7	0.3	1.3	0.7	14,165	14,025	7,902	8,287
Social Security and public assistance income only	0.3	0.1	0.2	0.1	0.4	0.2	(B)	(B)	(B)	(B)
Social Security and property income only[2]	21.2	4.5	15.0	2.5	28.2	9.0	9,065	9,047	5,231	5,181
All other income[3]	36.9	10.7	33.6	7.5	40.7	17.8	11,837	10,614	5,799	5,337

- Represents zero or rounds to zero. B Base less than 75,000.

[1] Includes a relatively small number of families reporting no money income, not shown separately.

[2] Includes income from rents, interests, and dividends.

[3] Other combinations of sources of income.

Source: U.S. Bureau of the Census, unpublished table prepared for the report Money Income of Households, Families, and Persons in the United States: 1980, Current Population Reports, Series P-60, No. 132, July 1982.

Table 8-10. Percent Distribution of Households, for Householders 65 Years and Over and All Ages, by Total Money Income, According to Various Income Growth Rates and Household Projections: 1977, 1985, 1990, and 1995

(In 1977 dollars)

Total money income	65 years and over				All ages				Difference between 65 years and over and all ages[1]	
	1977	1985	1990	1995	1977	1985	1990	1995	1977	1995
FAMILY HOUSEHOLDS										
Series 1-C[3]										
Number	8,204	9,203	9,987	10,468	56,958	63,079	67,181	70,611	(X)	(X)
Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	-	-
Under $5,000	16.9	13.9	12.2	10.9	8.9	8.4	8.0	7.5	+8.0	+3.4
$5,000 to $9,999	38.1	36.9	35.9	34.9	18.0	16.9	16.1	15.6	+20.1	+19.3
$10,000 to $14,999	19.5	20.0	20.6	20.9	18.5	16.7	16.2	15.1	+1.0	+5.8
$15,000 to $24,999	16.2	17.9	18.5	19.7	32.0	31.2	29.7	28.5	-15.8	-8.8
$25,000 to $34,999	5.4	6.6	7.5	7.6	14.3	16.4	17.7	18.7	-8.9	-11.1
$35,000 to $49,999	2.3	2.8	3.2	3.7	5.7	7.2	8.5	10.0	-3.4	-6.3
$50,000 and over	1.5	1.8	2.0	2.4	2.6	3.2	3.8	4.6	-1.1	-2.2
Median income in dollars	9,129	9,856	10,326	10,800	16,083	17,257	18,035	18,915	[2]76	[2]75
Percent increase over 1977	(X)	7.9	13.1	18.3	(X)	7.3	12.1	17.6	(X)	(X)
Series 2-C[3]										
Number	8,204	9,203	9,987	10,468	56,958	63,079	67,181	70,611	(X)	(X)
Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	-	-
Under $5,000	16.9	11.5	8.7	6.3	8.9	7.2	6.2	5.4	+8.0	+0.9
$5,000 to $9,999	38.1	34.9	32.1	28.7	18.0	15.5	14.0	12.6	+20.1	+16.7
$10,000 to $14,999	19.5	20.7	22.1	23.5	18.5	15.7	14.1	13.0	+1.0	+10.5
$15,000 to $24,999	16.2	19.4	20.8	22.4	32.0	30.1	27.7	24.9	-15.8	-2.5
$25,000 to $34,999	5.4	7.8	8.8	9.4	14.3	18.1	20.2	20.6	-8.9	-11.2
$35,000 to $49,999	2.3	3.5	4.5	5.9	5.7	9.3	12.0	15.2	-3.7	-9.3
$50,000 and over	1.5	2.2	3.0	3.8	2.6	4.1	5.8	8.4	-1.1	-4.6
Median income in dollars	9,129	10,662	11,737	12,895	16,083	18,672	20,499	22,585	[2]76	[2]75
Percent increase over 1977	(X)	16.8	28.6	41.3	(X)	16.1	27.5	40.4	(X)	(X)
Series 3-D[3]										
Number	8,204	9,421	10,225	10,706	56,958	64,045	68,178	71,414	(X)	(X)
Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	-	-
Under $5,000	16.9	9.3	5.8	3.4	8.9	5.9	4.4	3.3	+8.0	+0.1
$5,000 to $9,999	38.1	32.5	27.0	21.3	18.0	13.7	11.2	9.0	+20.1	+12.3
$10,000 to $14,999	19.5	21.5	23.6	23.5	18.5	16.2	12.6	10.4	11.0	13.1
$15,000 to $24,999	16.2	21.0	22.8	25.5	32.0	29.0	25.0	21.1	-15.8	+4.4
$25,000 to $34,999	5.4	8.6	10.3	11.9	14.3	20.4	21.5	20.9	-8.9	-9.0
$35,000 to $49,999	2.3	4.5	6.5	8.3	5.7	11.3	16.5	20.5	-3.4	-12.2
$50,000 and over	1.5	2.8	4.1	6.0	2.6	5.4	9.1	14.9	-1.1	-8.9
Median income in dollars	9,129	11,559	13,377	15,454	16,083	20,333	23,663	27,757	[2]76	[2]80
Percent increase over 1977	(X)	26.6	46.5	69.3	(X)	26.4	47.1	72.6	(X)	(X)
NONFAMILY HOUSEHOLDS										
Series 1-C[3]										
Number	7,022	8,658	9,878	10,889	19,071	25,435	29,611	33,583	(X)	(X)
Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	-	-
Under $5,000	64.4	60.6	58.3	55.6	39.1	34.3	31.9	29.9	+25.3	+25.7
$5,000 to $9,999	24.7	26.9	27.9	29.2	27.0	26.0	24.8	26.4	-2.3	+4.8
$10,000 to $14,999	6.4	7.1	7.9	8.3	16.4	17.2	17.9	17.2	-10.0	-8.9
$15,000 to $24,999	3.3	4.0	4.2	4.9	12.8	16.0	17.3	19.2	-9.5	-14.3
$25,000 to $34,999	0.6	0.8	1.1	1.2	3.1	4.2	5.2	5.8	-2.5	-4.6
$35,000 to $49,999	0.4	0.4	0.4	0.4	1.1	1.5	1.8	2.3	-0.7	-1.9
$50,000 and over	0.2	0.2	0.3	0.4	0.6	0.8	1.0	1.2	-0.4	-0.8
Median income in dollars	3,859	4,159	4,361	4,567	6,606	7,705	8,371	8,992	[2]71	[2]97
Percent increase over 1977	(X)	7.8	13.0	18.3	(X)	16.6	26.7	36.1	(X)	(X)
Series 2-C[3]										
Number	7,022	8,658	9,878	10,889	19,071	25,435	29,611	33,583	(X)	(X)
Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	-	-
Under $5,000	64.4	56.3	50.8	42.1	39.1	31.8	27.6	23.2	+25.3	+18.9
$5,000 to $9,999	24.7	28.9	31.8	37.3	27.0	25.2	24.2	23.8	-2.3	+13.5
$10,000 to $14,999	6.4	8.2	9.2	10.8	16.4	17.2	17.1	17.2	-10.0	-6.4
$15,000 to $24,999	3.3	4.7	5.8	6.8	12.8	17.8	20.4	21.5	-9.5	-14.7
$25,000 to $34,999	0.6	1.2	1.3	1.7	3.1	5.1	6.4	8.2	-2.5	-6.5
$35,000 to $49,999	0.4	0.4	0.5	0.6	1.1	1.9	2.7	4.0	-0.7	-3.4
$50,000 and over	0.2	0.3	0.5	0.6	0.6	1.0	1.6	2.1	-0.4	-1.5
Median income in dollars	3,859	4,501	4,957	5,454	6,606	8,336	9,515	10,737	[2]71	[2]97
Percent increase over 1977	(X)	16.6	28.5	41.3	(X)	26.2	44.0	62.5	(X)	(X)
Series 3-D[3]										
Number	7,022	8,263	9,192	9,886	19,071	22,368	24,216	25,766	(X)	(X)
Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	-	-
Under $5,000	64.4	51.6	39.8	27.6	39.1	30.6	24.4	18.1	+25.3	+9.5
$5,000 to $9,999	24.7	31.5	38.2	44.7	27.0	25.3	25.6	26.8	-2.3	+17.9
$10,000 to $14,999	6.4	9.0	11.6	13.9	16.4	16.6	16.5	16.9	-10.0	-1.0
$15,000 to $24,999	3.3	5.7	7.3	9.2	12.8	18.5	19.9	20.6	-9.5	-11.4
$25,000 to $34,999	0.6	1.3	1.7	2.6	3.1	5.6	7.8	11.0	-2.5	-8.4
$35,000 to $49,999	0.4	0.5	0.8	1.2	1.1	2.3	3.8	5.4	-0.7	-4.2
$50,000 and over	0.2	0.5	0.6	0.8	0.6	1.3	2.0	3.2	-0.4	-2.4
Median income in dollars	3,859	4,877	5,645	6,527	6,606	8,596	10,009	11,527	[2]71	[2]77
Percent increase over 1977	(X)	26.4	46.3	69.1	(X)	30.1	51.5	74.5	(X)	(X)
PERCENT EXCESS OF MEDIAN INCOME, FAMILY HOUSEHOLDS OVER NONFAMILY HOUSEHOLDS										
Series 1-C	136.6	136.9	136.8	136.5	143.5	124.0	115.4	110.4	(X)	(X)
Series 2-C	136.6	136.9	136.8	136.4	143.5	124.0	115.4	110.3	(X)	(X)
Series 3-D	136.6	137.0	137.0	136.8	143.5	136.5	136.4	140.8	(X)	(X)

- Represents zero.   X Not applicable.

[1] Gain or loss in percentage points. [2] Percent difference in median income. [3] Series 1-C: 1 percent annual income growth rate and household projection series C. Series 2-C: 2 percent annual income growth rate and household projection series C. Series 3-D: 3 percent annual income growth rate and household projection series D.

Source: U.S. Bureau of the Census, *Illustrative Projections of Money Income Size Distributions for Households: 1980 to 1995*. Current Population Reports, Series P-60, No. 122, March 1980.

Table 8-11. Percentage of Households With Elderly Householders Receiving Specified Noncash Benefits: 1979

(Numbers in thousands. The sum of percentages exceeds 100.0 because the percentages are not mutually exclusive)

Type of household	Number	Percent of households with noncash benefits: Medicare	Medicaid	Food stamps	Residing in public or subsidized housing
Households with householders 65 years and over	16,149	93.1	16.4	6.3	5.3
All households	79,108	23.4	10.1	7.5	3.2
Households below poverty level with householders 65 years and over	2,926	93.0	35.9	23.1	11.9
All households below poverty level	9,549	34.9	39.8	37.4	12.3

Source: U.S. Bureau of the Census, Current Population Reports, Series P-23, No. 110, Characteristics of Households and Persons Receiving Noncash Benefits: 1979, March 1981.

Table 8-12. Proportion of Retirement History Study Respondents Reporting on Assets, and Mean Assets, by Type of Assets, Marital Status, and Sex: 1975, 1971, and 1969

(Assets in 1969 constant dollars)

Item	1975				1971				1969			
	Total	Married men	Non-married men	Non-married women	Total	Married men	Non-married men	Non-married women	Total	Married men	Non-married men	Non-married women
Number of cases[1]	6,857	4,249	524	2,049	6,857	4,249	524	2,049	6,857	4,249	524	2,049
Reporting on total assets	5,214	3,226	432	1,531	5,196	3,197	429	1,544	5,059	3,057	426	1,554
Reporting on liquid assets	5,532	3,400	451	1,654	5,507	3,374	447	1,658	5,741	3,494	475	1,746
Reporting on illiquid assets	6,709	4,154	512	2,008	6,735	4,170	512	2,018	6,578	4,046	508	1,990
Reporting on home equity	6,386	3,961	502	1,891	6,407	3,976	505	1,895	6,228	3,841	483	1,874
Percent owning assets	89	94	81	80	87	93	79	77	86	92	77	77
Owning liquid assets	81	86	75	73	78	84	72	68	77	82	69	68
Owning illiquid assets	24	30	21	13	25	31	19	15	27	33	20	18
Owning home	69	82	51	46	67	80	48	46	63	77	42	41
Mean value (dollars):												
Mean total assets	27,614	35,786	19,654	12,659	26,549	33,789	21,451	13,156	28,171	36,416	20,541	13,918
Mean liquid assets	10,719	13,710	9,481	4,930	10,098	12,404	11,333	5,169	10,822	13,604	9,759	5,548
Mean illiquid assets	5,171	7,198	3,691	1,395	6,360	8,878	3,502	1,932	6,592	9,071	4,046	2,192
Mean home equity	11,740	14,862	7,075	6,398	11,012	13,718	6,838	6,438	10,463	13,193	5,798	6,040

[1] The number of respondents frequently does not agree with the number of cases. The categories of respondents owning various types of assets are not mutually exclusive.

Source: Joseph Friedman and Jane Sjogren, "Assets of the Elderly as They Retire." Social Security Bulletin, Vol. 44, No. 1, January 1981 (U.S. Social Security Administration, Retirement History Study, Report No. 23, January 1981).

Table 8-13. Percent Distribution of Annual Expenditures by Budget Item, for All Families and Families by Age of Householder: 1972-73

Expenditure	All families	Age of family householder: 65 and over	Under 65 years	55 to 64 years
Current consumption expenses, total	$8,270.48	$4,866.50	$9,127.54	$7,858.68
Current consumption expenses, percent	100.0	100.0	100.0	100.0
Food	19.3	21.4	19.1	18.8
Alcoholic beverages	1.3	1.0	1.4	1.4
Tobacco products and smoking supplies	1.6	1.2	1.6	1.7
Housing	30.8	34.1	30.4	28.6
Clothing	6.8	5.0	7.1	6.4
Dry cleaning and laundry	1.0	1.0	1.0	1.0
Transportation	19.3	14.4	20.0	20.4
Health care	6.4	10.4	5.8	7.7
Personal care	2.0	2.4	2.0	2.3
Recreation	8.6	7.3	8.7	8.5
Reading	0.6	0.3	0.6	0.6
Education	1.3	0.9	1.4	1.5
Miscellaneous	1.0	0.6	1.0	1.1

Source: U.S. Department of Labor, Bureau of Labor Statistics, Consumer Expenditure Survey: Integrated Diary and Interview Survey Data, 1972-1973, Bulletin 1992, 1978.

Table 8-14. Societal Aged Dependency Ratios: 1920 to 2040

(Figures are shown for July 1 of year indicated. Ratios for 1940 and later years include Armed Forces overseas)

Year	Ratio:[1] $\frac{\text{Population 65 years and over}}{\text{Population 18 to 64 years}}$ X 100			Index:[1] Actual series		
ESTIMATES						
1920	8.0			43		
1930	9.1			49		
1940	10.9			59		
1950	13.4			72		
1960	16.8			90		
1970	17.6			94		
1980	18.6			100		
1981	18.7			101		
	Middle series	Highest series	Lowest series	Middle series	Highest series	Lowest series
PROJECTIONS[2]						
1985	19.5	19.4	19.5	105	104	105
1990	20.7	20.7	20.6	111	111	111
2000	21.2	21.5	20.7	114	116	111
2010	21.9	22.5	21.2	118	121	115
2020	28.7	28.9	28.4	154	155	153
2030	36.9	36.0	37.8	198	194	203
2040	37.7	35.9	39.6	203	193	213

[1] Base year is 1980.

[2] See text for explanation of middle, highest, and lowest series. Base date of projections is July 1, 1981.

Source: Based on U.S. Bureau of the Census, Current Population Reports, Series P-25, Nos. 311, 519, 614, 917, and 922.

Appendix A.
Sources of Data on the Older Population

PROGRAM SOURCES

The principal primary sources of national data on the older population are:

Decennial Census of Population (U.S. Census Bureau). The Decennial Census of Population provides information every 10 years for the United States and its geographic subdivisions regarding the age, sex, race, marital status, household composition, occupation, employment, income, migration, educational level, etc., of the population.

Current Population Survey (U.S. Census Bureau and U.S. Bureau of Labor Statistics). The "CPS" is a survey of a representative sample (75,000 households in 629 primary sampling units in March 1981) of the U.S. population conducted each month. It carries annual supplements on marital status and household composition, fertility, educational level, migration, and income, and obtains monthly data on the labor force and employment. The Census Bureau is responsible for the analysis of the annual supplements and the Bureau of Labor Statistics is responsible for the analysis of the labor force data. The CPS provides national and regional estimates but not State and local estimates. While it provides less geographic detail than the census, there is more in-depth exploration of subjects.

Vital Registration System and Life Table Program (National Center for Health Statistics). Data on births and deaths, compiled from birth and death certificates filed in local health jurisdictions, and derived measures are published for the United States, States, and smaller geographic areas. The death statistics are tabulated nationally in terms of age, sex, race, cause, and other characteristics of the decedent.

National Health Interview Survey (National Center for Health Statistics). This survey has been conducted annually since 1957 by the U.S. Bureau of the Census on behalf of the National Center for Health Statistics and is a major source of information on the health status of older persons. It provides, through household interviews, national information at varying intervals on acute and chronic health conditions, injuries and accidents, limitations on activity, visits to physicians, dentists, and hospitals, days spent in bed, and financial expenses associated with obtaining medical care. The survey involves a continuous sampling and interviewing of the civilian noninstitutional population of the United States. The sample of households interviewed each week is representative of the U.S. population, and the weekly samples are additive over time.

Various other data collection systems contribute more limited information on the status of older people or will provide such data in the future. For example:

Decennial Census of Housing (U.S. Bureau of the Census). The Decennial Census of Housing provides information every 10 years for the United States and its geographic subdivisions regarding tenure, facilities, value or rent, utilities, year built, etc., of housing in relation to age of the householder.

National Health and Nutrition Examination Survey (National Center for Health Statistics). This is the only source of detailed national information on the changing health status of the American population as measured by actual physical examination, chemical and laboratory tests, and physical measurements. The survey has been conducted five times since 1960, the last time being 1980. (Other health surveys include the Hospital Discharge Survey, a sample of records of short-stay hospitals, the National Medical Care Expenditure Survey, and the National Nursing Home Survey.)

Consumer Expenditure Survey (U.S. Bureau of Labor Statistics). This survey provides information on the expenditure practices of families. It was conducted at intervals of 10 years, but since 1980, data have been gathered continuously. Data were last published for 1972-73. Beginning with the last quarter of 1980, the survey consists of an interview conducted each quarter and a 2-week diary record. The Bureau of the Census designs the questionnaire and sample in collaboration with the Bureau of Labor Statistics.

Panel Study of Income Dynamics (Survey Research Center, University of Michigan). This is a longitudinal survey that has been conducted annually since 1968 and covers a representative sample of families in the United States. It seeks to improve knowledge of the determinants of family income and its changes.

Retirement History Study (Social Security Administration). This is a survey of older people with a longitudinal design. This design was chosen to make it possible to study changes in the process of retirement over time. The initial respondents in the sample, interviewed in 1969, were 58 to 63 years of age and included both beneficiaries and nonbeneficiaries. They were interviewed every second year for a period of 10 years until 1979, during which time most of them went through the process of retirement and settled into a period of post-worklife.

Survey of Income and Program Participation (U.S. Bureau of the Census). This survey will secure continuous data on cash and in-kind income, assets, liabilities, taxable and disposible income, and receipts of benefits from major cash and in-kind transfer programs. It has not yet been put into the field, but has been designed and is ready for actual field collection. Various test and research panels have been surveyed for 1977-78, 1978, and 1979, and these data are being made available under the title Income Survey Development Program. The Bureau of the Census designed the samples and is conducting the survey.

PUBLICATION SOURCES, OR GUIDES TO SOURCES, OF CENSUS BUREAU DATA

1980 Census of Population

General U.S. Bureau of the Census Guides to Census Data. *Tentative Publication and Computer Tape Program,* 1980 Census of Population and Housing, revised February 1982.

General U.S. Bureau of the Census Sources of Data on the Older Population. Three series of national and State reports based on the 1980 Census of Population are planned: PC(1)-B, General Population Characteristics: This series presents data for States, counties, metropolitan areas, county subdivisions, and places of 1,000 inhabitants or more (all State reports have been published). PC(1)-C, General Social and Economic Characteristics: This series presents data for States, counties, metropolitan areas, and places of 2,500 or more inhabitants (in preparation). PC(1)-D, Detailed Characteristics: This series presents data for States and large metropolitan areas (in preparation).

About 35 special subject statistical reports based on the 1980 Census of Population are planned, including: PC(2)-9D, The Older Population; PC(2)-4A, Household and Family Composition; PC(2)-6A, Labor Force Status and Work Experience; PC(2)-4C, Marital Characteristics; PC(2)-4D, Persons in Institutions and Other Group Quarters; PC(2)-8A, Sources and Structure of Household and Family Income; PC(2)-8C, Characteristics of Poverty Population; PC(2)-4B, Living Arrangements of Adults and Children; PC(2)-9E, Women.

Computer tape files of various kinds will be available at cost. Summary Tape Files (STF): Five tape files on magnetic computer tape provide the detailed tabulations required for PC(1)-B, PC(1)-C, PC(1)-D, and other reports. Public Use Microdata Samples: These are samples of census records containing questionnaire responses for a representative sample of households. One percent and five percent microdata samples are being prepared; variations of these samples permit tabulations for States or metropolitan areas. Geographic identification extends to areas of 100,000 or more inhabitants.

Two series of reports are based on the 1980 Censuses of Population and Housing: PHC(1), Block Statistics [each SMSA, each city of 10,000 or more outside SMSA's]; PHC(2), Census Tracts [each SMSA].

Four series of reports are based on the 1980 Census of Housing: HC(1), Detailed Housing Characteristics: This series presents data for States, counties, SCSA's, SMSA's, urbanized areas, places of 2,500 or more inhabitants, Indian reservations, and Alaskan native villages; HC(2), Metropolitan Housing Characteristics [each SMSA]; HC(3), Subject Reports: The special statistical report on *Housing of the Elderly* will present data on housing characteristics of persons 60 years and over and householders 60 years and over; HC(4), Components of Inventory Change [United States, each region, and selected SMSA's].

1970 Census of Population

General U.S. Bureau of the Census Guides to Census Data. *Publication and Computer Summary Tape Program,* 1970 Census of Population and Housing, June 1973; *Reference Manual on Population and Housing Statistics from the Census Bureau,* Washington, D.C., March 1977, revised February 1978.

General U.S. Bureau of the Census Sources of Data on the Older Population. Three series of national and State reports based on the 1970 Census of Population: PC(1)-B, General Population Characteristics; PC(1)-C, General Social and Economic Characteristics; PC(1)-D, Detailed Characteristics.

Forty special subject reports based on the 1970 Census of Population, including: PC(2)-4A, Family Composition; PC(2)-4C, Marital Status; PC(2)-4E, Persons in Institutions and Other Group Quarters; PC(2)-8A, Sources and Structure of Family Income; PC(2)-9A, Low Income Population.

Two series of reports based on the 1970 Censuses of Population and Housing: PHC(1), Census Tracts [each SMSA]; PHC(3), Employment Profiles of Selected Low-Income Areas [76 low-income areas in 51 cities and 7 rural poverty areas].

Three series of reports based on the 1970 Census of Housing: HC(2), Metropolitan Housing Characteristics [each SMSA]; HC(3), Block Statistics [each urbanized area]; HC(4), Components of Inventory Change [United States, each region, 15 selected SMSA's]. Several special subject reports based on the 1970 Census of Housing, including: HC(7)-2, Housing of Senior Citizens.

Special Studies, Compilations, and Current Reports

Seven series of Current Population Reports based on the Current Population Survey, special surveys, the current program of nonsurvey population estimates and projections, and the current program of special censuses:

P-20 Population Characteristics. This series presents data for the United States and regions based on the Current Population Survey.

P-23 Special Studies. See especially: No. 59, *Demographic Aspects of Aging and the Older Population in the United States*, Feb. 1979; No.69, *1976 Survey of Institutionalized Persons: A Study of Persons Receiving Long-Term Care*, June 1978. No. 85, *Social and Economic Characteristics of the Older Population: 1978*, August 1979; No. 111, *Social and Economic Characteristics of Americans During Midlife*, June 1981.

P-25 Population Estimates and Projections. This series presents data for the United States, States, counties, and county subdivisions.

P-26 Federal-State Cooperative Program of Population Estimates. This series presents data for States and counties.

P-27 Farm Population of the United States. This series is published in cooperation with the U.S. Department of Agriculture.

P-28 Special Censuses.

P-60 Consumer Income. This series presents Income data for persons and families and statistics on poverty.

In addition to the Current Population Reports, the reports of the Annual Housing Survey, Series H-150, include a small amount of current housing data on the elderly.

Special studies prepared in collaboration with the U.S. Administration on Aging: U.S. Bureau of the Census and U.S. Administration on Aging, *Social Statistics for the Elderly, Area Level System, Stage 1: Omaha,1975;* U.S. Bureau of the Census and U.S. Administration on Aging, *Social Statistics for the Elderly,State Level System, Nebraska Social Report, 1975;* U.S. Administration on Aging, *The Elderly Population: Estimates by County: 1976*, by Donald G. Fowles, 1980; U.S. Bureau of the Census and U.S. Administration on Aging, *Guide to Census Data on the Elderly*, 1978; U.S. Administration on Aging, National Clearing House on Aging, *Inventory of Federal Statistical Programs Relating to Older Persons*, 1979.

Other Studies: Richard C. Taeuber and Richard C. Stockwell, "National Social Data Series: A Compendium of Brief Descriptions," *Review of Public Data Use*, Vol. 10, Nos. 1-2, pp. 23-111, May 1982, reprinted by the Social Science Research Council; Jacob S. Siegel and Cynthia M. Taeuber, "The 1980 Census and the Elderly: New Data Available to Planners and Practitioners," *Gerontologist*, Vol. 22, No. 2, April 1982, pp. 140-150.

Appendix B.
Quality of Data on the Older Population

POPULATION STATISTICS

Census data. Like all data on age, the statistics on the older population are subject to errors of coverage and errors of misreporting of age and other characteristics. Data on the older population, however, apparently suffer from a greater measure of error and are affected by biases to a greater extent than the data for the younger population. In addition, the sample data are subject to sampling "error."

Information on the quality of the age data in censuses comes from a number of sources. For 1970 these were: demographic analysis, which provided estimates of net errors (combining both net coverage error and net age reporting error) in the census statistics; a match study of the census and the Current Population Survey (CPS), which provided information on the consistency of the reporting of age in the two data collection systems for persons who were enumerated in both; a match study of the census and the "Medicare" enrollment files, which provided information on the gross omissions of persons 65 years of age and over from the census;[138] and census tabulations on the proportion of persons for whom a particular characteristic was allocated.

The estimated percents of net error in the 1970 census for the population 55 years and over and its component age, sex, and race groups, as derived by demographic analysis, are shown in table B-1. The age groups 55 to 64, 65 to 74, and 75 and over show small to substantial net undercounts—2.5 percent, 0.4 percent, and 4.2 percent, respectively. The group 65 years and over taken as a whole shows a net undercount of 2 percent. Net undercounts are quite pronounced for Blacks 55 to 64 years (7.5 percent) and 75 years and over (7.0 percent), but there is an estimated net overcount of 1.7 percent at ages 65 to 74. The net overcount resulted from age misreporting; in the present case many persons with actual ages 55 to 64 and 75 years and over appear to have reported ages in the age interval 65 to 74.

The 1970 Census-Medicare Match Study indicated a gross omission from the census of 4 percent of the population 65 years and over (table B-2). According to the study, the 1970 census missed about 3.5 percent of those 65 to 69 years and 5.8 percent of those 75 years and over. Considered in combination with a net census undercount of 2 percent for the population 65 years and over, derived by demographic analysis, this percent of gross omission implies an estimate of 2 percent net reporting into the group 65 years and over. This pattern of gross omission and age overreporting is most pronounced for the Black-and-other-races male population. For this group, a gross omission of 12 percent and a net census overcount of 1 percent, combined with a net error in sex-race misreporting of about 2 percent, imply that 9 percent of the population reported as 65 years or over in the census may actually have been under age 65. If many people under 65 years of age are reported in the census as "over 65," there is the possibility of substantial error in measuring the characteristics of people over age 65. The characteristics given for many "elderly" persons would really apply to persons who are under age 65.

The 1970 CPS-Census Match Study provided information on both gross "errors" in reporting age (i.e., gross inconsistency or dissimilarity in the age group reported) and net "errors" in reporting age (i.e., the balance of inconsistent reports into and out of any age group). Gross inconsistency in reporting age showed a general tendency to increase with age and to be substantial at the higher ages. Estimated indexes of inconsistency (a measure of gross error) for ages 60 to 64, 65 to 69, 70 to 74, and 75 years and over are 10 percent, 12 percent, 10 percent, and 8 percent, respectively, as compared with 7 percent for the population of all ages.[139] Inconsistency in reporting age for Blacks at the older ages appeared to be much higher than for the population of all races. The indexes are 50 to 140 percent greater.

Percents of net differences (a measure of net error) for the age classification in 5-year age groups according to sex and race are all small in the 1970 CPS-Census Match Study and do not provide evidence of any substantial bias in the age data—contrary to the suggestions given by the gross reporting errors from the same match study and the net reporting errors obtained as residuals from the Census-Medicare Match Study. There appears to have been net overreporting of the age group 65 to 74, which was complemented by net underreporting of the age group 55 to 64.

Part of the error in the age data in the 1970 census, particularly for the elderly, may have resulted from the assignment of ages to persons who were enumerated but whose ages were not reported in the census. Although about 10 percent of all persons whose ages were reported in the census were reported in the group aged 65 and

---

[138] U.S. Bureau of the Census, 1970 Census of Population and Housing, Evaluation and Research Program PHC(E)-4, *Estimates of Coverage of Population by Sex, Race, and Age: Demographic Analysis*; PHC(E)-11, *Accuracy of Data for Selected Population Characteristics as Measured by the CPS-Census Match*; PHC(E)-7, *The Medicare Record Check: An Evaluation of the Coverage of Persons 65 Years of Age and Over in the 1970 Census*.

[139] U.S. Bureau of the Census, PHC(E)-11, table 11, *op. cit.*

Table B-1. Estimated Percents of Net Census Error for the Population 55 Years and Over, by Age, Sex, and Race: 1980 and 1970

(A minus sign (-) denotes a net undercount and a plus sign (+) a net overcount)

Year and age	All classes			White[1]			Black[1]		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
1980									
All ages	+0.4	-0.5	+1.2	+0.6	-0.1	+1.2	-4.8	-7.5	-2.1
55 to 64 years	+0.9	-0.5	+2.2	+1.0	-0.2	+2.2	-3.1	-6.2	-0.4
55 to 59 years	+0.7	-1.0	+2.3	+0.9	-0.5	+2.3	-4.2	-7.8	-1.0
60 to 64 years	+1.1	-	+2.2	+1.1	+0.2	+2.0	-1.8	-4.1	+0.2
65 to 74 years	+2.4	+1.8	+2.8	+1.9	+1.4	+2.3	+5.0	+4.3	+5.6
65 to 69 years	+3.4	+2.4	+4.3	+3.0	+2.2	+3.7	+5.2	+3.1	+6.7
70 to 74 years	+1.0	+0.8	+1.1	+0.5	+0.3	+0.6	+4.9	+6.1	+4.0
75 years and over	-0.1	+0.6	-0.4	-	+0.6	-0.4	-3.1	-0.5	-4.7
65 years and over	+1.4	+1.4	+1.4	+1.1	+1.1	+1.1	+2.0	+2.7	+1.5
1970									
All ages	-2.2	-3.1	-1.4	-1.6	-2.2	-1.0	-7.6	-10.1	-5.3
55 to 64 years	-2.5	-2.6	-1.8	-1.7	-2.0	-1.4	-7.6	-8.8	-6.6
55 to 59 years	-2.0	-2.7	-1.4	-1.3	-1.9	-0.8	-9.0	-10.4	-7.7
60 to 64 years	-2.4	-2.4	-2.3	-2.1	-2.0	-2.1	-5.8	-6.6	-5.2
65 to 74 years	-0.4	-0.7	-0.2	-0.6	-0.8	-0.5	+1.8	-0.4	+2.8
65 to 69 years	-0.8	-1.4	-0.2	-1.1	-1.4	-0.8	+2.6	-0.7	+5.3
70 to 74 years	-	+0.2	-0.1	-	+0.1	-0.2	+0.6	+2.2	-0.6
75 years and over	-4.2	-3.3	-5.0	-4.2	-3.6	-4.6	-7.6	-2.5	-10.9
65 years and over	-1.9	-1.6	-2.2	-2.0	-1.8	-2.2	-1.5	-0.5	-2.2

- Represents zero.

[1] Census tabulations for the races have been adjusted to assign several million persons of Hispanic origin who did not report a specific race in the census to one of the specified races, principally White.

Source: Based on unpublished records of the U.S. Bureau of the Census.

Table B-2. Comparison of Percents of Net Census Error Based on Aggregate Medicare Data and Percents of Gross Omission Based on the Census-Medicare Match Study, for the Population 65 Years and Over, by Sex and Race: 1970

(Errors per 100 corrected population. A minus sign (-) denotes net undercount, gross omission, or net understatement due to sex-race or age misreporting, and a plus sign (+) denotes net overcount or net overstatement due to sex-race or age misreporting)

Sex and race	Net census error[1]	Gross omission[2]	Differences		
			Total[3]	Part due to sex-race misreporting[2]	Remainder[3]
Total	-1.9	-4.0	+2.1	-	+2.1
White male	-1.8	-4.0	+2.2	-0.3	+2.5
White female	-2.2	-3.1	+0.9	-0.4	+1.3
Black and other races male	-0.5	-11.7	+11.2	+2.4	+8.8
Black and other races female	-2.2	-7.4	+5.2	+5.3	-0.1

- Represents zero.

[1] Based on a comparison of census counts and aggregate Medicare data. Figures have been adjusted for underenrollment in Medicare. See table B-1.

[2] Based on the Census-Medicare Match Study. Figures have been adjusted for census imputations.

[3] Derived by subtraction. Age misreporting is presumably a major contributor to the "total difference" and the "remainder," which also include sampling error, errors due to matching problems, and omissions in Medicare enrollment not already allowed for in the percents of net census error.

Source: Adapted from table B-1 and U.S. Bureau of the Census, 1970 Census of Population and Housing: Evaluation and Research Program, PHC(E)-4, Estimates of Coverage of Population by Sex, Race, and Age: Demographic Analysis, 1973.

over, 14 percent of the allocated ages fell into this group.[137] Overall, age was allocated for 2.7 percent of the total population, but for the population 65 years and over, age was allocated for 3.6 percent.

Only very limited, preliminary information is now available regarding the quality of the 1980 census data. Tabulations of the 1980 census age distribution can be compared with the population expected on the basis of the 1970 census counts, and with the estimated "true" population derived by the method of demographic analysis. The census count of the total population in 1980 exceeds the estimated true population by about 800,000, or by 0.4 percent. This fact suggests that the level and age pattern of net census errors are quite different in 1980 from the level and pattern in 1970. In fact, the census count of persons 65 years and over exceeds the estimated true population by 1.4 percent.[138] The explanation for this type of difference is not at hand, but some possible factors that could account for it include the overreporting of ages above 65 years in the census, the counting of some people who should have been excluded from the census, the counting of some people twice, the omission of illegal aliens from the estimated population, and errors in the estimated population.[139]

Net overcounts are typical of the 1980 census figures for age groups according to the results of demographic analysis. The age group 55 to 64 years showed a net overcount of about 1 percent, and the age group 65 to 74 years showed a net overcount of about 2½ percent. Net overcounts characterized Whites and females, and particularly White females; net overcounts were larger for White females than White males, especially at the ages 55 to 74 years. A comparison of the coverage rates for Blacks and Whites suggests, overall, poorer coverage for Blacks than for Whites (i.e., net undercount of 4.8 percent for Blacks versus a net overcount of 0.6 percent for Whites) but greater "coverage" for Blacks at ages 65 and over (i.e., net overcount of 2.0 percent for Blacks versus net overcount of 1.1 percent for Whites). For Blacks, net undercounts at ages 55 to 64 years (3.1 percent) and 75 years and over (3.1 percent) are complemented by a net overcount at ages 65 to 74 years (5 percent). This pattern of net census errors suggest overreporting of ages 65 to 74 at the expense of ages 55 to 64 and 75 and over. Adjustment of the estimated "true" figures for the older ages or for Blacks to allow for illegal immigration would not substantially change the measures of net undercount or net overcount for these groups.

A match of the April and August 1980 Current Population Surveys with the 1980 census provided a range of alternative coverage estimates for 1980. The figures for the total population range from an undercount of 2.0 percent to an overcount of 1.0 percent. For Blacks, the estimates range from an undercount of 0.7 percent to an undercount of 7.2 percent. The range of estimates for the Hispanic population is roughly the same as for Blacks. For the balance of the population (i.e., the non-Black, non-Hispanic population), coverage tended to be better, ranging from an overcount of 1.4 percent to an undercount of 1.1 percent. The corresponding figures are not yet available for age groups from this source.

The relative frequency with which people leave one or more questions unanswered on their census form is higher for the older population than for the rest of the population. If a full-scale study were carried out, the nonresponse ratios for characteristics would probably be especially high for the elderly who live alone and even higher for institutionalized persons. In 1980, age was allocated for 4.0 percent of persons 65 years and over, a proportion higher than for any other age group; overall, age was allocated for 2.9 percent of the population (complete count).[140] The allocation rate was low for the category "inmate of an institution," only 1.5 percent; on the other hand, it was high for disability (4.7 percent), especially in relation to the use of public transportation (10 percent), and for grandparent (14 percent). In Florida, these proportions were well above the U.S. average—6.7 percent for disability, 43 percent for public transportation disability, and 21 percent for grandparent.

Further information on the quality of reporting for the older population in the 1980 census must await additional results of the 1980 census evaluation program. Both demographic analysis and matches between the census, the Current Population Survey, and the Social Security files will be employed to shed further light on the accuracy of the census data on the older population in 1980.

Some gerontologists have shown special interest in the number and characteristics of centenarians, since their characteristics may provide clues as to the factors conducive to longevity. The census provides a count of centenarians in the United States, but this "count" tends to overstate greatly the true number. Alternative estimates of the number of centenarians in 1970 vary from 3,500 to 8,000. The preferred estimate is 4,800, or only about .002 percent of the total population of 203 million.[141]

---

[137] U.S. Bureau of the Census, 1970 Census of Population, *General Population Characteristics*, PC(1)-B1, U.S. Summary, table B-2.

[138] Revision of data published in U.S. Bureau of the Census, *Coverage of the National Population in the 1980 Census, by Age, Sex, and Race: Preliminary Estimates by Demographic Analysis*, by J.S. Passel, J.S. Siegel, and J.G. Robinson,Current Population Reports, Series P-23, No. 115, February 1982.

[139] Demographic analysis provides a rough estimate of the coverage of the legally resident population in the 1980 census, obtained by removing the estimated number of illegal residents counted in the census from the census count and comparing the new census figure with the demographic estimate of the legally resident population. This comparison indicates that the undercount of the legally resident population was roughly 0.5 percent. This type of adjustment hardly modifies the coverage estimates for the population over 55 years of age. See Jeffrey S. Passel, Charles D. Cowan, and Kirk Wolter, "Coverage of the 1980 Census," paper presented at the annual meeting of the Population Association of America, Pittsburgh, PA, April 13-16, 1983.

[140] C.M. Taeuber, J. Thompson, and A.F. Young, "1980 Census Data: The Quality of the Data and Some Anomalies," paper presented at the annual meeting of the Population Association of America, Pittsburgh, PA, April 13-16, 1983.

[141] Jacob S. Siegel and Jeffrey S. Passel, "New Estimates of the Number of Centenarians in the United States," *Journal of the American Statistical Assocation*, Vol. 71, No. 355, September 1976. See also Ira Rosenwaike, "A New Evaluation of the U.S. Census Data on the Extreme Aged," *Demography*, Vol. 16, No. 2, 1979, pp. 279-288.

The number of persons shown as 100 years and over in the 1970 census was 106,000, representing a gross overstatement of the true number. The extreme error in the count of centenarians in 1970 is believed to have resulted principally from a misinterpretation by some respondents of the instructions relating to the placement of responses on age on the census questionnaire.

The 1980 census "counted" 32,000 centenarians, but only 24,000 persons were actually reported as centenarians. Some 8,000 achieved this status by allocation. Research is under way to determine the basis of this tremendous allocation rate. The files of the Social Security Administration provide a count of some 15,000 centenarians for 1980, but even this figure appears to overstate the actual figure. There is no systematic validation of the age of the extreme aged in Social Security records.

The 1980 census, following the plans of the 1970 census, will not provide any published information regarding the demographic or other characteristics of centenarians beyond their sex and geographic distribution. For purposes of gerontological research, this lack of ready information is no great loss. The census will have a fair amount of data on persons 85 years and over, as did the 1970 census. Persons of this age have certainly achieved sufficient longevity to serve as a population for study of the characteristics of persons successful in living to extreme old age. Moreover, additional information can be secured by special tabulations of the characteristics of persons 85 years and over (in age groups to 100 and over), although the data would be affected by considerable age misreporting.

Estimates and projections. The (nonsurvey) population estimates and projections presented in this report were derived by the methods of demographic accounting and demographic analysis. The national estimates for age, sex, and race categories are based on statistics from the population censuses, statistics and estimates of births, deaths, and net immigration, and statistics on the strength of the Armed Forces. They are affected both by errors in the census data (coverage and age-sex-race misreporting) and by errors in the estimation of population change for the period since the census. For the national estimates, the components of change particularly subject to error are deaths, which suffer especially from misreporting of the age of decedents, and net immigration. For the older population, the former component is far more important than the latter one.

The component of births is especially subject to error in projections of population because of its great variability. Errors in the projection of births adversely affect the projection of the proportion of elderly in the population from the start of the projection period. For projections of the number of older persons, especially over a long period, the component of deaths is a principal area of concern, in spite of the relative regularity of changes in death rates. The uncertainty regarding the course of future fertility, mortality, and immigration has led to the use of alternative assumptions regarding each of these components of population change in preparing population projections.

Current Population Survey data. The estimates of the socioeconomic characteristics of the national population shown in this report are sample estimates based on the Current Population Survey. The Current Population Survey covers a representative sample of the noninstitutional population of the United States. It has undergone many changes in sample size and design in the last three decades.[142] In March 1981, the sample was spread over 629 areas located in 1,133 counties, independent cities, and minor civil divisions, with coverage in each of the 50 States and the District of Columbia; approximately 65,000 households (out of a sample of 75,000) were interviewed. In March 1970, the sample was spread over 449 areas, and 48,000 households were interviewed.

The estimates based on the Current Population Survey are subject to both sampling "error" and nonsampling errors (i.e., response and processing errors), and errors in the assumptions used to estimate the final figures from the weighted (i.e., inflated) sample. These estimates may differ somewhat from figures that would have been obtained from a complete census because of sampling variability. The estimates from the Current Population Survey shown in this report have been published previously in the Census Bureau's Current Population Reports, Series P-20 and P-60, which include information about sampling errors.

After inflation by the sampling weight, the aggregate figures for each age-sex-race category from the Current Population Survey are subject to an adjustment for consistency with the postcensal (nonsurvey) estimates of the civilian noninstitutional population of the United States in each of these categories. This adjustment is aimed at decreasing sampling variability but also allows for coverage errors and age-sex-race reporting errors in the survey in relation to the census-based population estimates. It does not allow for errors of coverage and misreporting that characterize the postcensal population estimates, however.

For the data collected in the Current Population Surveys in the years 1972 to 1981, the independent postcensal estimates used were based on the 1970 Census of Population; for data collected in the years 1962 to 1971, the independent estimates were based on the 1960 Census of Population, and for data collected in the years 1952 to 1961, the independent estimates were based on the 1950 census. The adjustment factors generally imply undercoverage in the Current Population Survey; this undercoverage varies with age, sex, and race. The percent differences of the weighted CPS figures from the independent postcensal estimates of the population 65 years and over, for age, sex, and race categories, for 1974 (monthly averages) are as follows:

---

[142] U.S. Bureau of the Census, The Current Population Survey: *Design and Methodology*, Technical Paper No. 40, 1978; Marvin H. Thompson and Gary Shapiro, "The Current Population Survey: An Overview," *Annals of Economic and Social Measurement*, Vol. 2, No. 2, pp. 105-129, 1973.

Age	All classes	White		Black and other races	
		Male	Female	Male	Female
65 years and over	-2.0	-0.6	-2.0	-7.2	-7.9
65 to 69 years	-3.4	-2.1	-2.5	-8.4	-17.4
70 to 74 years	+2.5	+0.8	+1.9	+8.6	+18.2
75 years and over	-3.8	-	-4.3	-18.6	-14.5
14 years and over	-3.9	-3.8	-2.2	-13.6	-8.0

This type of adjustment makes the underlying assumption that the percent in a given socioeconomic class of a particular age-sex-race cagetory, as indicated by the Current Population Survey (e.g., percent widowed of White males 65 to 69 years of age), applies to the population that was missed by the survey in the field, as well as to the population that was actually enumerated by the survey. If the population omitted by the survey has a different distribution for a particular socioeconomic characteristic (e.g., marital status) within the age-sex-race category from the population enumerated, the results are biased. There is no firm evidence regarding the socioeconomic characteristics of the persons missed by the Current Population Survey, as compared with those enumerated in the survey. The accuracy of the absolute estimates from the Current Population Survey also depends on the validity of this assumption.

In addition, the CPS estimates understate (or overstate) the numbers in any class (e.g., widowed White males 65 to 69 years of age) to the extent that the age-sex-race category concerned was understated (or overstated) in the census (e.g., when the group was at the appropriate younger age). This results from the fact that the postcensal estimates and the census figures tend to understate the population relative to the "true" numbers.

Estimates of the combined percents of omission of the weighted (inflated) survey figures for the ages over 65 prior to the adjustment to the independent postcensal estimates, for 1976 (monthly averages), are shown in table B-3. This table indicates, for example, that the Current Population Survey obtained information in the field for only 79.7 percent of the Black male population 75 years and over and only 72.5 percent of the Black female population 75 years and over.

Table B-3. Estimates of the Percents of Total Net Error of the Weighted CPS Figures Prior to the Adjustment to the Independent Population Estimates, for the Population 65 Years and Over and 14 Years and Over, by Sex and Race: Monthly Averages, 1976

(A minus sign (-) denotes net undercount, net undercoverage, or net understatement, and a plus sign (+) denotes net overcount, net overcoverage, or net overstatements)

Age and sex	White			Black and other races		
	CPS[1]	Census[2]	Combined[3]	CPS[1]	Census[2]	Combined[3]
MALE						
65 to 69 years..........	-2.9	+0.2	-2.7	-7.5	+6.7	-1.3
70 to 74 years..........	-	+0.1	+0.1	+0.6	+0.7	+1.3
75 years and over......	-0.7	-3.6	-4.3	-20.1	-0.3	-20.3
14 years and over......	-3.7	-2.7	-6.3	-11.5	-10.0	-20.4
FEMALE						
65 to 69 years..........	-5.0	+1.1	-4.0	-14.5	+11.7	-4.5
70 to 74 years..........	+1.4	-0.4	+1.0	+12.4	-5.8	+5.9
75 years and over......	-4.8	-5.9	-10.4	-13.2	-16.5	-27.5
14 years and over......	-2.4	-1.3	-3.7	-6.3	-4.2	-10.2

- Denotes less than ± .0005.

[1] 12-month average of undercoverage (-) or overcoverage (+) percents in CPS.

[2] Preferred estimates of net undercount (-) or net overcount (+) percents in the 1970 census (PHC (E)-4, tables 4 and 5).

[3] Computed as [CPS omission rate x (1-census omission rate) + census omission rate].

DEATH AND HEALTH STATISTICS

Deaths for age groups. Death statistics as reported in the official sources were accepted for use in this report without any adjustment for underregistration, the misreporting of the age, sex, or race of the decedent, or misclassification according to the cause of death. Some deaths may not be registered, but a more important problem would appear to be the misreporting of the characteristics of decedents, particularly their age. There is the further possibility that there is a difference between the age pattern of the net misreports of age for decedents and the age pattern of net errors for the age of the population; any difference would tend to distort age-specific death rates and life-table survival rates calculated from the data.

No national test of the completeness of death registration in the United States has ever been conducted. It is very probable that registration is complete or nearly complete, in view of the strict legal requirements for registration and the needs of the survivors for proof of death in connection with burial and other purposes. Beneficiaries of older decedents would be especially motivated to comply with death-registration requirements. On the other hand, registration could be evaded more easily in the case of infants and in geographically isolated areas. On balance, there is probably extremely little, if any, underregistration of deaths, especially of older persons.

Two national studies provide evidence of the misreporting of age on death certificates: the so-called Chicago Mortality Study, a match of death certificates in the 4-month period May-August 1960 and census records,[143] and a comparison of death rates based on the Social Security ("Medicare") files and death rates from the registration system in the years 1968 to 1978.[144] The former study indicates that, at ages 45 and over, inconsistency of age reporting is particularly great for Black-and-other races (table B-4). A substantially smaller number of deaths would have been classified in each of the age groups 45 to 64 years on the basis of the age given in the census than on the basis of the age given on the death certificate, and a substantially larger number would have been classified in each of the age groups over 75 years. The comparison of deaths according to "certificate" age and deaths according to "census" age suggests that the reported death rates for Black-and-other-races males

Table B-4. Percent Differently Reported and Percent Net Difference Between Deaths During May-August 1960, by Age as Stated in the 1960 Census Record and as Stated on the Death Certificate, by Race, Sex, and Specified Age Interval

(A plus sign (+) denotes an excess of deaths reported on death certificates; a negative sign (-) denotes a deficit of deaths reported on death certificates)

Age	All classes	White		Black and other races	
		Male	Female	Male	Female
PERCENT DIFFERENTLY REPORTED					
Single years.....................	33.6	27.3	35.0	57.0	65.9
Interval, 5-year groups..........	15.7	11.3	16.3	32.5	42.0
Interval, 10-year groups........	11.2	8.1	11.4	23.8	30.3
PERCENT NET DIFFERENCE					
1 to 4 years.....................	-1.7	-1.0	-2.7	-2.4	-
5 to 14 years....................	-1.0	+1.4	-3.9	-2.9	-4.1
15 to 24 years...................	-2.4	-1.1	-4.2	-1.2	-11.0
25 to 34 years...................	-7.5	-3.3	-14.9	-5.6	-8.2
35 to 44 years...................	-5.5	-6.0	-7.0	-4.7	+2.4
45 to 54 years...................	+0.8	-1.0	-0.9	+7.2	+18.1
55 to 64 years...................	+0.7	-1.1	-2.0	+14.4	+24.2
65 to 74 years...................	-0.3	+1.1	-1.8	+0.6	-1.5
75 to 84 years...................	+1.1	+0.6	+3.9	-15.2	-14.7
85 years and over...............	+1.1	+3.0	+2.4	-14.9	-28.2

- Represents zero.

Source: Thea Z. Hambright, "Comparison of Information on Death Certificates and Matching 1960 Census Records: Age, Marital Status, Race, and Country of Origin," Demography, Vol. 6, No. 4, November 1969, table 2, pp. 413-423.

---

[143] U.S. Public Health Service, National Center for Health Statistics, "Comparability of Age on the Death Certificate and Matching Census Report, United States, May-August 1960," Vital and Health Statistics, Series 2, No. 2, by Thea Z. Hambright, June 1968, tables B and 8. See also Evelyn M. Kitagawa and Philip M. Hauser, *Differential Mortality in the United States: A Study in Socioeconomic Epidemiology*, Vital and Health Statistics Monographs, American Public Health Association, Harvard University Press, Cambridge, MA, 1973.

[144] John Wilkin, "Recent Trends in the Mortality of the Aged," *Transactions of the Society of Actuaries*, Vol. 33, No. 1, 1981, pp. 53-86.

and females aged 45 to 64 years may be seriously biased upward and the death rates for Black-and-other-races males and females aged 75 and over may be seriously biased downward. Taking into account net census errors in the population figures might affect this conclusion.

Death rates are affected not only by errors in death statistics but also by errors in the population estimates used in computing the rates. Rates employing postcensal population estimates are affected by the undercounts (or overcounts) for the same age cohorts in the previous decennial census. As noted, studies indicate differences in the census coverage among population subgroups; that is, some age, sex, and race groups are more completely enumerated than others. To the extent that these estimates are valid, net census undercounts can affect vital statistics measures. For example, if the population is adjusted for net undercounts, the gap between male and female death rates and between White and Black death rates will be reduced. Differences in life expectancy will be similarly affected. The general effect of correcting age-specific death rates for net census undercounts is to increase the estimates of life expectancy at birth for both Whites and Blacks, but the life expectancy of Blacks is increased more than for Whites.

The set of death rates based on "Medicare" records is believed to represent mortality levels more accurately than that based on registration records. In the former case, coverage of the population and deaths is essentially complete and consistent, the ages of the decedents and the population are identified from the same record, and the ages are validated to a large extent. Reporting of the age of decedents among the extreme aged (85 years and over) in the vital registration system is believed to be inaccurate. The exact age of most decedents at these ages is not known to surviving relatives, friends, or neighbors, and their reports of age are often a guess, with a tendency towards exaggeration. Because of serious errors in the counts of population at these ages also, death rates for age groups among the extreme aged as conventionally computed are unreliable, and death rates based on Medicare tabulations or "charter" beneficiaries under Social Security should be preferred at these ages.[145]

A comparison between Medicare death rates and the conventional death rates based on the registration system, for age groups 65 and over, shows wide differences for Black-and-other-races. It shows generally higher rates from the registration system than from the Medicare tabulations at ages 65 to 69 and 70 to 74 and generally lower rates at the older ages (table B-5). For the White population, the Medicare death rates are rather similar to the death rates from the registration system.

Cause of death. The medical certification of death is made by a physician, a medical examiner, or a coroner. The reliability and accuracy of cause-of-death statistics are, to a large extent, governed by the ability of the medical attendant to make the proper diagnosis and by the care with which he or she completes the death certificate. Standard classification lists have been developed to upgrade the accuracy, completeness, and comparability of cause-of-death reporting but do not insure that they will be achieved.

One study of the quality of the basic data reported on the death certificate involved an inquiry to physicians regarding a sample of deaths occurring in Pennsylvania during three months of 1956. In almost two-fifths of the cases included in the study, the supporting diagnostic data provided by the physician was sketchy, and for less than three-fifths of the cases, the diagnostic data given was considered good or very good.[146] The quality of the diagnostic information varied considerably with the cause of death. In this study, the diagnostic data for many disease categories appeared to provide an adequate basis for medical certification of cause of death. On the basis of another "followback" study involving a sample of all deaths which occurred in the United States in July and August 1960, the National Center for Health Statistics estimated that 70 to 75 percent of the deaths classified as caused by cardiovascular-renal diseases as a single category were reasonable inferences on the basis of the diagnostic information provided by the physician.[147]

One indicator of the quality of cause-of-death reporting is the proportion of deaths assigned the cause "symptoms and ill-defined conditions." Although in some cases it is not possible to determine the cause of death, this proportion may be taken as a measure of the care given to the certification by attending physicians. It may also be used as a rough measure of the specificity of the medical diagnosis made by the medical attendants in various areas. In 1977, 1.6 percent of all reported deaths in the United States were assigned to ill-defined or unknown causes; this percentage varied among the States from 0.3 to 8.3 percent.

Health Interview Survey data.[148] The population covered by the sample for the Health Interview Survey is the civilian noninstitutional population of the United States living at the time of the interview. The sample does not, therefore, include residents of institutions and members of the Armed Forces.

In addition, the estimates do not represent a complete measure of any given topic during the specified calendar period, since data are not collected in the interview for persons who died during the reference period. A complete survey conducted on July 1, for example, would include the experience of approximately one-half of the decedents during a given year. Thus, the conditions, events, and services for the remaining half of the decedents are missing from the interview data regardless of whether the reference period of the interview item is 2 weeks or a complete year. In 1978, for example, there were 1,928,000 deaths in the United States. Estimates of the experience attributable to approximately 964,000 of these persons are missing from the interview survey. Since about 38 percent of all deaths are attributable to diseases of the heart, about 370,000 cases of heart diseases are missed in the survey. The prevalence estimates of other causes of death, with lower mortality rates, may be affected to a lesser extent by the exclusion of decedents.

---

[145] See Wilkin, op. cit. See also Ira Rosenwaike, "A Note on New Estimates of the Mortality of the Extreme Aged," *Demography*, Vol. 18, No. 2, 1981, pp. 257-266; and Francisco R. Bayo and Joseph F. Faber, "Mortality Experience Around 100", *Transactions of the Society of Actuaries*, Vol. 35, No. 1, p. 21, 1983.

[146] For a more complete report, see I.M. Moriyama et al., "Inquiry into Diagnostic Evidence Supporting Medical Certifications of Death," *American Journal of Public Health*, Vol. 48, No. 10, Oct. 1958, pp. 1376-1387.

[147] I.M. Moriyama et al., "Evaluation of Diagnostic Information Supporting Medical Certification of Cardiovascular Disease Deaths," paper presented at the meeting of the American Public Health Association, Kansas City, MO, Nov. 13, 1963.

[148] For further information regarding the procedures and limitations of the Health Interview Survey, see U.S. Public Health Service, National Center for Health Statistics, "Health Interview Survey Procedures, 1957-1974," *Programs and Collection Procedures*, Series 1, Number 11, April 1975.

It has been established through methodological studies and from statistics provided by the Hospital Discharge Survey that individuals experience higher rates of disability and hospital episodes and receive a greater number of medical services during the last year of life than do persons

Table B-5. Comparison of Death Rates Based on Registration Data and Death Rates Based on Medicare Data for the Population 65 Years and Over, by Age, 1978, and by Age and Race, 1976

(Rates per 1,000 population)

Year, race, and age	Registration rate		Medicare rate		Ratio of registration to Medicare rate	
	Male	Female	Male	Female	Male	Female
1978 (PRELIMINARY)						
All Classes						
65 years and over[1].....	64.6	42.0	64.7	41.4	.998	1.016
65 to 69 years...............	34.6	16.8	35.5	17.1	.974	.980
70 to 74 years...............	52.1	27.0	52.1	26.4	1.000	1.023
75 to 79 years...............	80.9	46.7	76.3	42.6	1.060	1.097
80 to 84 years...............	115.1	74.9	112.2	71.4	1.026	1.049
85 years and over............	170.8	135.9	187.0	143.9	.914	.945
1976						
All Classes						
65 to 69 years...............	35.8	17.1	37.2	17.8	.964	.963
70 to 74 years...............	54.3	28.5	53.7	27.9	1.012	1.023
75 to 79 years...............	82.5	48.5	78.3	45.8	1.054	1.059
80 to 84 years...............	114.9	76.3	112.6	75.8	1.021	1.006
85 years and over............	179.3	142.7	179.8	143.6	.997	.994
White						
65 to 69 years...............	35.4	16.5	36.7	17.3	.964	.954
70 to 74 years...............	53.4	27.2	53.3	27.3	1.001	.998
75 to 79 years...............	82.4	47.4	78.4	45.2	1.051	1.048
80 to 84 years...............	117.6	77.4	113.2	75.7	1.039	1.022
85 years and over............	187.0	147.7	182.7	144.5	1.023	1.022
Black and Other Races						
65 to 69 years...............	39.6	22.3	41.8	22.6	.948	.986
70 to 74 years...............	64.0	44.5	57.0	34.5	1.123	1.287
75 to 79 years...............	84.1	61.3	78.5	51.7	1.071	1.187
80 to 84 years...............	89.1	63.2	106.9	76.5	.833	.827
85 years and over............	115.2	92.3	154.6	123.6	.745	.747

[1] Age-adjusted by the direct method using the enumerated population of the United States on April 1, 1970 as a standard.

Sources: 1978: Rates from tables 2, 4, and 5 in John C. Wilkin, "Recent Trends in the Mortality of the Aged," *Transactions of the Society of Actuaries*, Vol. 33, No. 1, 1981, pp. 53-86.

1976: Unpublished data from Social Security Administration; National Center for Health Statistics, "Final Mortality Statistics, 1976," *Monthly Vital Statistics Report*, Vol. 26, No. 12, Supplement (2), March 30, 1978; registration rates were computed on the basis of unrounded population figures corresponding to Current Population Reports, Series P-25, No. 800, April, 1979.

in the general population. On the basis of these findings, it can be estimated that as a maximum the rates among the decedents missed in the survey might be three times as high as those for the surveyed population. Test calculations suggest, however, only a trivial effect from the exclusion of decedent experiences on interview survey data and the corresponding rates.

Since the statistics presented in the reports are based on a sample, they will differ somewhat from the figures that would have been obtained if a complete census had been taken using the same schedules, instructions, and interviewing personnel and procedures. The effect of ratio-estimation in processing the sample (i.e., adjustment of the sample to independent postcensal population estimates) is to make the sample more closely representative of the civilian noninstitutional population classified by age, sex, color, and residence, and thereby to reduce sampling variance.

As in any survey, the results are also subject to reporting and processing errors and errors due to nonresponse. There are limitations to the accuracy of diagnostic and other information collected in household interviews. For diagnostic information, the household respondent can usually pass on to the interviewer only the information the physician has given to the family. For conditions not medically attended, diagnostic information is often no more than a description of symptoms. However, other facts, such as the number of disability days caused by the condition, can be obtained more accurately from household members than from any other source, since only the persons concerned are in a position to report this information.

Appendix C.
Methodology for Estimates of Net Migration of the Elderly for States

TWO CONCEPTS OF NET MIGRATION FOR AGES

This appendix describes two different methods of estimating intercensal net migration of the population 65 years of age and over, corresponding to two different concepts for defining the migration of these ages. According to the first concept, net migration during a given period is measured for the population that is 65 years and over at the time the individuals move; that is, the estimates relate to persons all of whom are in the age *group* 65 and over at the time of migration. According to the second concept, net migration for the period is measured for the age *cohorts* that are 65 years and over at the end of the period or at some other specific date during the period. In this case, the ages of the migrants at the time of migration will vary during the estimate period. For example, if the cohort is aged 65 and over at the end of the decade, it is aged 55 and over at the beginning; if the cohort is aged 65 and over at mid-decade, it is aged 60 and over at the beginning. We believe that estimates of net migration for the same age group over the period of estimation are more useful for many purposes than estimates of net migration for age cohorts.

The first concept is applied in this report in the measurement of net migration of the elderly for the decade 1970-80, and the second concept is applied in the measurement of net migration of the elderly for the decades 1970-80 and 1960-70. The cohorts selected for applying the second concept of net migration in this report were those 65 years and over in 1965 (60 and over in 1960 and 70 and over in 1970) and 65 years and over in 1975 (60 and over in 1970 and 70 and over in 1980). It was not possible to complete estimates of net migration for the age group 65 and over as such for the 1960-70 decade for this report. While, in part, the various sets of estimates were derived by different methods and represent different concepts, they are believed to be sufficiently comparable to permit roughly consistent analysis of the volume of net migration of the elderly for States in the two decades.

NET MIGRATION FOR AGE GROUP 65 AND OVER, 1970-80

We have derived estimates of the net migration of elderly persons for each State between 1970 and 1980 by use of a modified version of the vital statistics residual method, that is, by subtracting estimates of "natural increase" 65 years and over for each State from the change in the number of persons 65 and over during the period. The basic equation is:

$$M^{70\text{-}80}_{65+} = [P^{80}_{65+} - P^{70}_{65+}] - [n_{65} - D_{65+}].$$

Evaluation of this equation involves use of the counts of the population aged 65 and over at the two censuses (P^{80}_{65+} and P^{70}_{65+}), the number of deaths at ages 65 and over in the decade (D_{65+}), and an estimate of the number of persons who reach age 65 during the decade (n_{65}). The last component corresponds to births in the conventional component estimating equation. This component is the most difficult one to deal with in applying the equation, since there are no direct data on it, and it must be estimated indirectly. Deaths at ages 65 and over for the intercensal years can be compiled directly from published data for the most part, although some estimation is necessary. The 1970 and 1980 census counts for these ages cannot be assumed to be consistent in coverage and should be adjusted for comparability insofar as possible. At the time these estimates were prepared, the evidence suggested that the 1980 census was more complete than the 1970 census. Accordingly, only the 1970 census counts were adjusted for net undercount. The adjustment factors for 1970 were derived from the estimates given in U.S. Bureau of the Census, *Developmental Estimates of the Coverage of the Population of States in the 1970 Census,* Current Population Reports, Series P-23, No. 85.

The procedure used for estimating the number of persons reaching age 65 (n_{65}) in the decade is to derive two provisional estimates, one by forward survival of the 1970 census population aged 55 to 64 years (${}'n_{65}$) and a second by reverse survival of the 1980 census population aged 65 to 74 years (${}''n_{65}$), and to average the two provisional estimates. In the first step survival rates are applied to the population aged 55 to 59 and the population aged 60 to 64 in 1970 in order to carry these groups forward to their 65th birthday. The formulas are:

$${}'n^{75\text{-}80}_{65} = P^{70}_{55\text{-}59} \times \frac{5\ell_{65}}{L_{55\text{-}59}}, \text{ and } {}'n^{70\text{-}75}_{65} = P^{70}_{60\text{-}64} \times \frac{5\ell_{65}}{L_{60\text{-}64}}$$

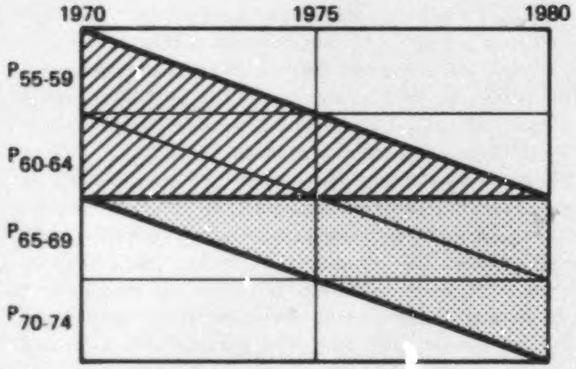
This calculation produces a provisional estimate that is affected by errors in the re-estimation of the 1970 census and by the failure to allow for net migration between the initial and terminal ages of the survival calculation (for example, between ages 55 to 59 and "reaching age 65").

The second provisional estimate is secured by applying survival rates in reverse to the population 65 to 69 years of age and the population 70 to 74 years of age in 1980 in order to carry these groups backward to their 65th birthday. The formulas are:

$$''n_{65}^{75\text{-}80} = P_{65\text{-}69}^{80} \div \frac{L_{65\text{-}69}}{5\ell_{65}}, \text{ and } ''n_{65}^{70\text{-}75} = P_{70\text{-}74}^{80} \div \frac{L_{70\text{-}74}}{5\ell_{65}}$$

This estimate is biased in that it incorporates the reporting errors of the 1980 census at ages 65 to 74 and erroneously includes net migration between the initial and terminal ages of the survival calculation (for example, between "reaching age 65" and ages 65 to 69).

In order to reduce the biases in the two provisional estimates of survivors, it is necessary to include net migration in the first provisional estimate of n_{65} (that is, $'n_{65}$) and to exclude it from the second provisional estimate of n_{65} (that is, $''n_{65}$). An examination of a Lexis diagram depicting the age-time relationships would show that roughly three-fourths of the net migration, in the 10-year period 1970-80, of the cohort with initial ages 55 to 59 in 1970, and one-fourth of the net migration in this period of the cohort with initial ages 60 to 64 in 1970 need to be added into $'n_{65}$:



The striped area in the diagram represents the net migration to be added.

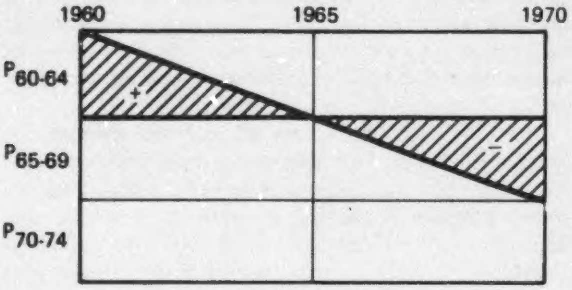
Net migration between "becoming 65" in 1970-80 and ages 65 to 74 in 1980 should also be subtracted from the reverse "survivors" in the second provisional estimate of n_{65}. This migration is represented by the stippled area in the diagram. Approximately one-fourth of the net migration of the cohort aged 65 to 69 in 1980 and three-fourths of the net migration of the cohort aged 70 to 74 in 1980 need to be subtracted from $''n_{65}$.

In the present case, instead of allowing directly for net migration in each provisional estimate of the number reaching age 65 during 1970-80, this was accomplished indirectly and more simply by averaging the two provisional estimates. These average figures are the figures shown in table 4-3 of this report.

NET MIGRATION FOR THE COHORT 65 AND OVER IN 1965, 1960-70, AND FOR THE COHORT 65 AND OVER IN 1975, 1970-80

As stated earlier, estimates of net migration for States for the decades 1970-80 and 1960-70 for the *cohort* 65 years and over were also prepared. It was necessary to make a determination as to the point in the decade when the cohort has these ages. Obvious alternatives include the beginning of the decade, the middle of the decade, and the end of the decade. For the 1960-70 period, estimates relating to the cohort 65 years and over in 1965 (60 and over in 1960 and 70 and over in 1970) were selected, in order to achieve the maximum comparability with the estimates of net migration for the age group 65 and over for the 1970-80 decade.

Estimates of net migration derived for this cohort include the net migration of some persons aged 60 to 64 in the early part of the decade prior to reaching age 65 and excludes the net migration of some persons aged 65 to 69 in the later part of the decade after reaching age 65. The two "error terms" would be expected to offset one another to a substantial degree for most States. The error terms are made apparent by the diagram, in which they are indicated by the striped areas:



The actual estimates of net migration for the cohort 65 years and over in 1965 for the 1960-70 period were computed by applying national census survival rates for 1960-70 (survival rate derived from national census data on age and sex) to the census population 60 and over in 1960 for each State and subtracting the survivors from the census population 70 and over in 1970 for the State. Because of the use of census survival rates, the census counts for States were accepted without adjustment in the calculations. The same procedure was applied to the corresponding data for 1970-80 to obtain estimates of net migration for the period 1970-80 for the cohort 65 years and over in 1975.

Appendix D.

Derivation of Estimated Proportion of Elderly Persons With a Surviving Child

The procedure used in deriving the proportion of women 65 years and over who had at least one surviving child in 1970 is described in this appendix. The method is based on 1970 census data on the distribution of ever-married women 65 years old and over by parity, or the number of children ever born, i.e., whether they had 0, 1, 2, 3, . . . 12, 13 children. The average age of these women was 73 years in 1970, and their mean age of childbearing was 27 years. Thus, the average age of their children, disregarding any correlation between age at motherhood and survival chances of mother or child, was 46 in 1970.

The steps in the calculation of the number of surviving children of one-parity women 65 years and over were as follows: first, the proportion of children who survive from birth to age 46 was calculated from life tables for 1929-31, 1939-41, and 1959-61 and converted into the proportion of children that died by taking the complement of the proportion that survived. Next, the number of elderly women of parity one (or the number of children of one-parity elderly women) was multiplied by the proportion of children that died before age 46, and this product was subtracted from the number of elderly women of parity one to obtain the number of elderly women of parity one with a surviving child.

The following steps were followed to compute the number of women 65 years old and over of parity two with at least one surviving child. First, it was assumed that the probability of dying for children of order two or higher is the same as that for children of order one. Second, the probability of both children of the same mother dying was computed as the square of the probability of one child dying. Then, the number of children that women 65 years and over of parity two had ever born (or the number of elderly women of parity two times two) was multiplied by the probability of both children dying and the resulting numbers of deaths were removed from the number of children. The number of surviving children was then divided by two. The result represents the number of women 65 and over of parity two with at least one surviving child.

In general, to obtain the number of women of parity *n* with at least one surviving child, the probability of a child dying was raised to the nth power (to allow for the joint probability of deaths of children); the complement of the result was multiplied by the number of children born to women of parity *n*, to obtain the number of surviving children; and the resulting number of survivors was divided by *n* to represent sibling groups, or the number of women of parity *n* with at least one surviving child. The numbers of women of various parities with at least one surviving child were then summed, and the sum was divided by the total number of women. The result is the overall proportion of women with at least one surviving child.

These computations were carried out separately for White and Black women. The proportions obtained were 80 percent for White women and 70 percent for Black women. The proportion for all women, including an adjustment for women of other races, was 78 percent.

Data on the fertility of men are not available. Parity distributions for elderly White men and elderly Black men would have to be estimated or assumed, possibly on the basis of those for women, and then the proportions of elderly White men and Black men with at least one surviving child at each parity could be computed as for women. For men, the survival period for the children is somewhat less (42 years) because of the men's younger age above 65. Finally, the proportion of men 65 years old and over of all races with at least one surviving child would be obtained by dividing the total number of elderly men with surviving children by the total number of elderly men. Further calculations would be necessary to derive an estimate of the proportion of elderly individuals or couples that had surviving children.

Appendix E.
Methodology of National Demographic Projections

POPULATION BY AGE, SEX, AND RACE

The population projections presented in chapters 1, 2, and 3 of this report correspond to or are consistent with the population projections published by the U.S. Census Bureau in Current Population Reports, Series P-25, No. 922. The latter report presents U.S. population projections for age, sex, and race categories from 1982 to 2050. The base date of the projections is July 1, 1981. The figures are consistent with the 1980 census counts in level and coverage, but the definitions of the races employed follow those of the 1970 census and the postcensal estimates since 1970, not those of the 1980 census.

The projections were prepared by use of the cohort-component method, in which the components of population change (births, deaths, and net immigration) are projected separately for each age cohort (persons born in each year), with alternative assumptions of fertility, mortality, and net immigration. The base population (July 1, 1981) was carried forward, year by year, in terms of single years of age, sex, and race, by means of projected survival rates and assumed amounts of net immigration. Each year a new birth cohort of infants derived by applying projected fertility rates to the surviving female population is added to the population and then carried forward, year by year, in the same manner as the initial population.

The principal assumptions for each of the series of population projections are shown in table F-1. For each component (fertility, mortality, and immigration), middle, high, and low assumptions were made. The middle assumption represents the likely future course of the component, and the high and low assumptions define a reasonable range of error around the middle level. The middle series of population projections incorporates middle levels of fertility, mortality, and immigration. The actual future course of population change could vary considerably from the middle projection of population change because of difficulties in predicting the future course of fertility, mortality, and immigration. To give an approximate idea of the possible range of error in the middle series, projection figures corresponding to the lowest total population (low fertility, high mortality, and low immigration) and projection figures corresponding to the highest total population (high fertility, low mortality, and high immigration) are also shown in this report.

Completed cohort fertility in the middle series was assumed to reach an ultimate level of 1.9 births per woman. This assumption is consistent with recent levels of fertility, women's reported expectations of future births, and current social and economic trends affecting the level of fertility, such as the increase of educational attainment, the rise in age at first marriage, and the increase in labor force participation of women. For the low and high assumptions of fertility, the ultimate levels selected were 1.6 births per woman and 2.3 births per woman. These levels were assumed to be attained by the 1985 birth cohort for White-and-other-non-Black races and by calendar year 2050 for Blacks.

Future mortality was assumed to decline as follows: Life expectancy at birth for Whites-and-other-non-Black races would reach 79.8 years by 2050 under the middle assumption, with a high-to-low error range of 83.3 years and 76.7 years. Life expectancy for Blacks was assumed to reach these same ultimate levels at a later date, 2080. The overall value for 1981 is 74 years.

The middle assumption on net immigration is a constant annual net influx of 450,000—an amount roughly

Table E-1. Current Estimates and Ultimate Fertility and Mortality Assumptions and Annual Net Immigration Assumptions Employed in the Principal Series of Population Projections

Series	Fertility assumption (lifetime births per woman)	Mortality assumption (life expectancy in 2050)	Immigration assumption (annual net immigration)
Current estimates:[1]			
1981	1.82	74.1	520,000
1982	1.83	74.5	[2]450,000
Projections:			
Middle[3]	1.9	79.6	450,000
Highest[4] . . .	2.3	83.3	750,000
Lowest[5]	1.6	76.7	250,000

[1] Base values for the projections; these are calendar-year (or period) measures.

[2] 1973-82 average.

[3] Middle fertility, middle mortality, middle immigration.

[4] High fertility, low mortality, and high immigration.

[5] Low fertility, high mortality, and low immigration.

equal to the estimated level of annual net immigration over the past decade. A wide range in the assumptions of annual net immigration is set (750,000 for the high assumption and 250,000 for the low assumption) to allow for the uncertainty relating to the future course of refugee movements, possible modifications in immigration legislation over the next several decades, and lack of adequate data on emigration of legal residents and on the movements of illegal residents.

The definitions of the races employed in the projections conform essentially to the definitions used in the 1970 census and differ from the definitions used in the 1980 census. The principal difference is that in the 1980 census the approximately 6 million persons of Hispanic origin who failed to report a specified conventional race and reported "other" race were left classified as of other race. In the 1970 census and the 1970-80 postcensal estimates, most of these persons would be classified as White. For the preparation of current estimates and projections, the race tabulations in the 1980 census were modified to reassign most Hispanics who reported "other" race to a specific race.

HOUSEHOLDS AND MARITAL STATUS

This section describes the methodology of the projections of the marital status of the population and of households for the United States published most recently by the Bureau of the Census and employed in this report.[149] Four main series of household and marital status projections, designated A, B, C, and D, were developed. These projections were based on series II (middle series) population projections published in Census Bureau report Series P-25, No. 704.[150] The projections exclude Armed Forces abroad and in military barracks in the United States, which are assumed to continue at the level of 1.3 million, as estimated for July 1, 1977. Current Population Survey data on the marital and household status of the population from 1964 through 1978 were utilized in preparing the projections of the proportions in each marital and household category. The principal separate marital and household categories employed were single, ever-married, ever-married spouse present, ever-married householders with spouse present, family householders not "married with spouse present," and nonfamily householders.

A curve of log-linear form

$$\log_e (x_t) = a_0 + a_1 t^*, \quad t^* = t - 1963 \qquad (1)$$

was fitted to the age-sex-specific proportions (x_t) for each marital and household category for the years 1964 to 1978, using a weighted least squares procedure. Equation (1) indicates that a straight line was fitted to the logarithms of the proportions [$\log_e (x_t)$]. This equation was used to obtain the projected values for 1995 (x_{1995}) when the estimate of a_1 was negative. When the estimate of a_1 was positive, it was necessary to use an alternative equation to insure that the projected proportion (x_{1995}) was between 0 and 1. The alternative equation was also fitted using weighted least squares.

$$\log_e (1 - x_t) = a_0 + a_1 t^*, \quad t^* = t - 1963 \qquad (2)$$

In this case, a straight line was fitted to the logarithms of the complements [$\log_e (1 - x_t)$] of the proportions. If the estimate of a_1 in (2) was also positive, the equation which had the smaller estimated value for a_1 was used to obtain x_{1995}.

After the projected values for 1995 for the various marital and household categories were obtained using equation (1) or equation (2), projections for the intervening years were derived by linear interpolation of the logarithms of the values for 1978 and 1995. Thus, intervening values were obtained from the formula:

$$\log \hat{x}_{1978+i} = \log x_{1978} + \frac{i}{17} (\log \hat{x}_{1995} - \log \hat{x}_{1978})$$

for i = 1, 2, . . . , 16

The projected marital and household proportions obtained by the method described were used in the series B projections. The projected proportions used in series A and D were weighted averages of series B proportions and the 1978 observed proportions. The weights used to obtain the series D proportions were one-third for the series B proportions and two-thirds for the 1978 proportions. To derive series A, the weights were four-thirds for the series B proportions and minus one-third for the 1978 proportions.

The marital and household proportions in series C were also projected using equation (1) or equation (2), but values for 1980 and 1995 were obtained in two separate stages. The first stage utilized data for the years 1974 through 1978 in equation (1) or (2) to obtain the projected values for 1979 and 1980. The second stage utilized data for the years 1966 through 1980 in equation (1) or (2) to obtain the projected values for 1995. The projected values for 1981 through 1994 were obtained by linear interpolation of the logarithms of the values for 1980 and 1995.

Next, the various series of projected proportions of persons in the marital status groups and of persons who are householders and in other categories of household relationship and family status, distributed by sex and age groups, were applied to each of the three series of population projections to derive the number of households and families by type and the number of persons in each marital category. To reconcile differences in the number of husband-wife couples obtained for males and the number obtained for females, the two projections were averaged.

---

[149] U.S. Bureau of the Census, *Projections of the Number of Households and Families: 1979 to 1995*, Current Population Reports, P-25, No. 805, 1979.

[150] U.S. Bureau of the Census, *Projections of the Population of the United States: 1977 to 2050*, Current Population Reports, P-25, No. 704, 1977.

EDUCATIONAL ATTAINMENT

The projections of educational attainment (years of school completed) shown in chapter 7 of this report were based on data in the March 1979 Current Population Survey. Projections were derived for the period 1980 to 2000 in 5-year time intervals for males and females 25 years old and over in 5-year age groups.

Population projections for March of each projection year consistent with the March 1979 current population estimates were derived through interpolation and adjustment of projections for July of each year published in Current Population Reports, Series P-25, No. 704. For comparability with the March 1979 CPS data, the population projections for March were adjusted to exclude the military population.

Two basic assumptions were made in preparing these projections of educational levels. First, it was assumed that formal education is completed by 30 years of age; this assumption is supported by the record of negligible changes in educational achievement after this age. Second, it was assumed that mortality is not selective according to educational level. Therefore, the percent distribution of the male and female populations with respect to educational attainment for each age cohort past age 30 was employed without change; that is, the percent distribution of the population by years of school completed for each age group was carried forward, separately for males and females, and applied to the population projections for the same age cohort in each future year. For example, the educational distribution of men 30 to 34 years old in 1980 was assumed to apply also to the projected male population 35 to 39 years old in 1985, 40 to 44 years old in 1990, etc. More specifically, the percent of males 35 to 39 years old in 1985, 40 to 44 years old in 1990, etc., with 4 or more years of college was assumed to be the same as that for males 30 to 34 years old in 1980. The projections for the various age groups and the two sexes were combined into totals for ages 25 and over after the projections for all age-sex categories were completed.

The only adjustments made in the base distribution of persons according to educational level was for persons 25 to 29 years old. Although virtually all persons have completed high school by this age that will ever do so, a substantial proportion of persons attended college beyond this age and a significantly larger proportion of 30-to-34-year-old high school graduates had attended and completed college than 25-to-29-year-olds. In order to allow for the greater college achievement at ages 30 to 34 than at ages 25 to 29, adjustments were made in the educational distribution of the 25-to-29-year age group. The distribution of the population according to years of school completed for 25-to-29-year-olds was retained through 4 years of high school, but proportions of high school graduates who completed college were adjusted to agree with the distribution of 30-to-34-year-old high school graduates who completed college.

This adjustment inflates the figures for the 25-to-29-year-old group to some extent, but when the cohort is "aged" 5 years, the distribution is in line with current figures for ages 30 to 34. The adjusted distribution for ages 25 to 29 was assumed to apply to persons 25 to 29 years old in each future year and then carried forward in time on a cohort basis to older ages. An assumption of constancy in the educational distribution of the new age cohorts, that is, those 25 to 29 years old in each future year, is viewed as more consistent with the record of changes in school enrollment ratios during the past several years than an assumption of an upward trend in the relative educational levels of those 25 to 29 years old.

LABOR FORCE

In 1980, the Bureau of Labor Statistics prepared three series of projections of the labor force to the year 2000, designated high growth series, medium growth series, and low growth series. The various series are based on three combinations of assumptions regarding future population growth and labor force participation ratios (i.e., proportions of the population at each age working or looking for work).[151] In deriving the various series of projections of the labor force, projected labor force participation ratios were applied to the Census Bureau's population projections covering the period from 1980 on.[152]

The general approach used in projecting the change in labor force participation ratios was to analyze the trend of age, sex, and race-specific "worker" ratios from the Current Population Survey for the 20-year period 1960-79 and the 8-year period 1972-79 and to extrapolate the ratios for each specific group. For each age, sex, and race group, estimates of the annual rates of change in the labor force participation ratios were derived for the short term by fitting a regression line to the ratios for 1972-79 and for the long term by fitting a regression to the ratios for 1960-79. These two sets of growth rates were employed in developing two of the three sets of projected ratios (high series and low series). Generally, the middle growth rate was a weighted combination of the high and low pattern. Typically, the historical rate of change for each projection series was "decreased exponentially" between 1979 and 2000.

The Bureau of Labor Statistics does not interpret the high and low series as representing "confidence intervals" but rather as "different views of the future." The method of calculation does not yield projections of new entrants or reentrants or of gross movement into and out of the labor force. The projections do not indicate the extent to which older workers engage in part-time work.

---

[151] For additional details, consult Howard N. Fullerton, Jr., "The 1995 Labor Force: A First Look," *Monthly Labor Review*, Vol. 103, No. 12, December 1980.

[152] U.S. Bureau of the Census, *Projections of the Population of the United States: 1977 to 2050*, Current Population Reports, Series P-25, No. 704, 1977.

Population. The levels of the projected labor force were calculated by applying the labor force ratios to the latest available population projections of the U.S. Census Bureau. These population projections were prepared in 1976, and hence, they do not take account of the 1980 census counts. The series II (medium fertility) population projections were used for all three series of labor force projections. This series assumes replacement-level fertility, modest declines in mortality, and a moderate amount of annual net immigration.

High growth series. The high growth projections assume rapid growth in the labor force participation ratios of women in the 1980's, except at the older ages. The labor force participation ratios for White men in the central ages were assumed to remain essentially constant or to rise slightly in the future; this assumption "reverses" a decline that has been occurring since 1960. The labor force participation ratios of Black men under age 65 were assumed to reverse their recent downward trend and to converge with the participation ratios of White men by the end of the century. The high growth series incorporates ratios at the higher ages that reflect the assumption that recent legislation and high inflation will stop the pattern of declining labor force participation. The ratios for persons 65 and over were assumed not to decline further and to remain constant for the period 1980-2000.

Middle growth series. Labor force participation ratios for women 45 to 64 were projected to increase at the pace of the 1960-79 period. This implies substantial increases for women 45 to 54 years of age and small increases for women 55 to 64 years of age. For most age groups, male participation ratios were projected to decline at the pace of 1960-79 or at half this pace (i.e., not as rapidly as in the 1970's). For older workers, labor force participation ratios would also continue to decline but at a much slower pace than during the 1972-79 period (i.e., at one-half the pace of 1960-79).

Low growth series. In the low series, the labor force participation ratios were generally projected on the basis of the experience of 1972 to 1979. The ratios for women under age 60 were projected to rise over the entire period 1980-2000 but at a decreasing rate. For men and older workers, labor force participation ratios were generally projected to decrease at about the same pace as in the 1970's. This rate of change was usually more rapid than in the longer 1960-79 period. This assumption resulted in an increased disparity in the labor force participation of Whites and Blacks.

MONEY INCOME DISTRIBUTION OF HOUSEHOLDS

The three series of projections of the income distribution of households given in table 8-10 were selected from the 14 series of illustrative projections of the income distribution of households previously published by the Census Bureau.[153] Income distributions according to household size and age of the householder for various types of households were held constant at the levels of the 1978 Current Population Survey.

Projections were prepared for various types of households for the years 1980, 1985, 1990, and 1995. The series of projections varied according to the annual growth rate in income assumed (from 0 to 4.0 percent). These growth rates were chosen for illustrative purposes only and do not necessarily represent the range of reasonable future alternatives in income growth rates. All projections were based on series II population projections and on series C and D household projections, selected from among the latest available national projections of population and households published by the Census Bureau.[154] The income intervals and amounts refer to dollars of 1977 purchasing power. Thus, the differences between the projected income distributions and those of the base year 1977 are "real" in that they do not reflect any change in the purchasing power of the dollar that may result from inflation.

In order to utilize the previously published set of income projections for the present report, it was desirable to make a selection among the 14 series of projections. A choice of levels of income growth rates was made in the following manner. Money income was adjusted for inflation for the years 1970 to 1979, and the average annual percent change was calculated for this period. This calculation showed an average annual growth rate in income of 2 percent. This result was considered as a medium assumption for the future trend of the income growth rate. A 1-percent growth rate was then defined as low, and a 3-percent growth rate was defined as high. Three series of income projections which combined these income growth assumptions with either household series C or household series D (1-C, 2-C, 3-D) were selected for presentation in this report.

---

[153] U.S. Bureau of the Census, *Illustrative Projections of Money Income Size Distributions, for Households: 1980 to 1995*, Current Population Reports, Series P-60, No. 122, March 1980.

[154] U.S. Bureau of the Census, *Projections of the Population of the United States: 1977 to 2050*, Current Population Reports, Series P-25, No. 704, July 1977; U.S. Bureau of the Census, *Projections of the Number of Households and Families: 1979 to 1995*, Current Population Reports, Series P-25, No. 805, May 1979.

Selected Bibliography

Barsby, Steve L., and Dennis R. Cox, *Interstate Migration of the Elderly: An Economic Analysis*, D.C. Heath and Company, Lexington, Massachusetts, 1975.

Bayo, Francisco, "Mortality of the Aged," *Transactions*, Society of Actuaries, Vol. 24, Part 1, March 1972, pp. 1-24.

Bourgeois-Pichat, Jean, "Essai sur la mortalité 'biologique' de l' homme," *Population* (Paris), Vol. 7, No. 3, July-Sept. 1952, pp. 381-394.

Bourgeois-Pichat, Jean, "Future Outlook for Mortality Decline in the World," in *Prospects of Population: Methodology and Assumptions*, Population Studies, Series A, No. 67, United Nations, New York, 1979.

Burch, P.R.J., "What Limits Life Span?" in B. Benjamin, P.R. Cox, and J. Peel (eds.), *Population and the New Biology*, Academic Press, New York, 1974, pp. 31-56.

Cain, Leonard D., "The Growing Importance of Legal Age in Determining the Status of the Elderly," *Gerontologist*, Vol. 14, No. 2, pp. 167-174, 1974.

Cantrell, R. Stephen, and Robert L. Clark, "Retirement and Promotional Prospects," *Gerontologist*, Vol. 20, No. 5, Part I, pp. 575-580, October 1980.

Coale, Ansley J., "The Effects of Changes in Mortality and Fertility on Age Composition," *Milbank Memorial Fund Quarterly*, Vol. 34, No. 1, January 1956, pp. 79-114.

Cowgill, Donald M., "Residential Segregation by Age in American Metropolitan Areas, *Journal of Gerontology*, Vol. 33, No. 3, pp. 446-453, 1978.

Cowgill, Donald O., "The Aging of Populations and Societies," *Annals of the American Academy of Political and Social Science*, special issue on Political Consequences of Aging, Frederick R. Eisele (ed.), No. 415, September 1974, pp. 1-17.

Foner, Anne, and Karen Schwab, *Aging and Retirement*, Brooks/Cole Publishing Co., Monterey, California, 1981.

Fries, James F., and Lawrence M. Crapo, *Vitality and Aging: Implications of the Rectangular Curve*, W. H. Freeman and Company, San Francisco, 1981.

Gelfand, Donald E., and Alfred J. Kutzik (eds.), *Ethnicity and Aging: Theory, Research, and Policy*, Springer Publishing Company, New York, 1979.

Glick, Paul C., "The Future Marital Status and Living Arrangements of the Elderly," *Gerontologist*, Vol. 19, No. 3, 1979, pp. 301-309.

Graff, Thomas O., and Robert F. Wiseman, "Changing Concentrations of Older Americans," *Geographical Review*, Vol. 68, No. 4, pp. 379-393.

Gutowski, Michael, and Tracy Feild, *The Graying of Suburbia, The Urban Institute, Washington, D.C., 1979.*

Hajimo, Urimo, et al. (eds.), *Recent Advances in Gerontology*, Excerpta Medica, Amsterdam, 1979. See especially papers by M. W. Riley and R. T. Campbell, Donald O. Cowgill, George C. Myers, and Yoichi Okazaki.

Haug, Marie R., "Age and Medical Care Utilization Patterns," *Journal of Gerontology*, Vol. 36, No. 1, Jan. 1981.

Hayflick, Leonard, "The Strategy of Senescence," *Gerontologist*, Vol. 14, No. 1, February 1974, pp. 37-45.

Hermalin, Albert I., "The Effect of Changes in Mortality Rates on Population Growth and Age Distribution in the United States," *Milbank Memorial Fund Quarterly,* Vol. 44, No. 4, Part 1, October 1966, pp. 451-469.

Herzog, Barbara R. (ed.), *"Aging and Income: Programs and Prospects for the Elderly,"* Human Sciences Press, New York, 1978, Special Publication No. 4 sponsored by the Gerontological Society, esp. article by Robert L. Clark and Joseph J. Spengler, "Changing Demography and Dependency Costs: The Implications of Future Dependency Ratios and their Composition," pp. 55-93.

Hobcraft, John, Jane Menken, and Samuel Preston, "Age, Period, and Cohort Effects in Demography: A Review," *Population Index,* Vol. 48, No. 1, pp. 4-43, Spring 1982.

Jarvik, Lissy F. (ed.), "Aging into the 21st Century: Middle-Agers Today," Gardner Press, Inc., New York, 1978, esp. articles by David McFarland, "The Aged in the 21st Century: A Demographic View," pp. 5-22, Alexander Comfort, "A Biologist Laments and Exhorts, pp. 41-60, and Bernice L. Neugarten, "The Future and the Young-Old," pp. 137-152.

Keyfitz, Nathan, and José Gomez de Leon, "Considérations démographiques sur les systèmes de retraite," *Population* (Paris), Vol. 35, No. 4-5, July-Oct. 1980.

Kennedy, J. M., and Gordon F. De Jong, "Aged in Cities: Residential Segregation in 10 USA Central Cities, *Journal of Gerontology,* Vol. 32, No. 1, pp. 197-202, 1977.

Kii, Toshi, "A New Index for Measuring Demographic Aging," *Gerontologist,* Vol. 22, No. 4, August 1982, pp. 438-442.

Kitagawa, Evelyn M., and Philip M. Hauser, *Differential Mortality in the United States: A Study in Socioeconomic Epidemiology,* Harvard University Press, Cambridge, Massachusetts, 1973.

Kobrin, Frances, "Family Extension and the Elderly: Economic, Demographic, and Family Cycle Factors," *Journal of Gerontology,* Vol. 36, No. 3, May 1981.

Longino, Charles F., Jr., and David J. Jackson (eds.), *Migration and the Aged,* an issue of *Research on Aging,* Vol. 2, No. 2, June 1980.

Manton, Kenneth G., "Sex and Race Specific Mortality Differentials in Multiple Cause of Death Data," *Gerontologist,* Vol. 20, No. 4, pp 480-493, August 1980.

Medvedev, Zhores A., "Aging and Longevity: New Approaches and New Perspectives," *Gerontologist,* Vol. 15, No. 3, June 1975, pp. 196-201.

Mindell, Charles N., "Multigenerational Family Households: Recent Trends and Implications for the Future," *Gerontologist,* Vol. 19, No. 5, pp. 456-463, Oct. 1979.

Neugarten, Bernice L., and Robert T. Havighurst (eds.), *Extending the Human Life Span: Social Policy and Social Ethics,* Committee on Human Development, University of Chicago, U.S. Government Printing Office, 1977.

Nightingale, Elena, "Prospects for Reducing Mortality in Developed Countries by Changes in Day-to-Day Behavior," *International Population Conference, Manila 1981,* pp. 207-232, International Union for the Scientific Study of Population, Liège, 1981.

Palmore, Erdman (ed.), *International Handbook on Aging: Contemporary Developments and Research,* Greenwood Publishing Company, Westport, Conn., 1980.

Preston, Samuel H., *Mortality Patterns in National Populations* (With Special Reference to Recorded Causes of Death), Academic Press, New York, 1976, esp. Chapter 7.

Ragan, Pauline K. (ed.), *Work and Retirement: Policy Issues,* The Ethel Percy Andrus Gerontology Center, University of Southern California Press, 1980.

Reimer, Cordelia, "Is Average Age at Retirement Changing?" *Journal of the American Statistical Association,* Vol. 71, No. 355, September 1976, pp. 552-558.

Riley, Matilda W., Marilyn E. Johnson, and Ann Foner (eds.), *Aging and Society,* Vol. III, *A Sociology of Age Stratification,* Russell Sage Foundation, New York 1972, esp. Chapters 2, 3, and 12.

Riley, Matilda White (ed.), *Aging from Birth to Death: Interdisciplinary Perspectives,* Westview Press, Boulder, Colorado, 1979, especially papers by Theodore T. Gordon, "Prospects for Aging in America," and Peter Uhlenberg, "Demographic Change and Problems of the Aged."

Rosenfeld, Albert, *Prolongevity,* Alfred A. Knopf, New York, 1976, especially Chapters 2, 17, 20, and 21.

Schulz, James H. *The Economics of Aging,* Second Edition, Wadsworth Publishing Company, Belmont, California, 1980.

Shanas, Ethel, "Health Status of Older People: Cross-National Implications," *Journal of the American Public Health Association,* Vol. 64, No. 3, March 1974, pp. 261-264.

Sheldon, Henry D., *The Older Population of the United States,* a volume in the Census Monograph Series, John Wiley and Sons, Inc., New York, 1958.

Sheppard, Harold L., and Sara E. Rix, *The Graying of Working America: The Coming Crisis of Retirement-Age Policy,* The Free Press, New York, 1977.

Treas, Judith, "Family Support Systems for the Aged: Some Social and Demographic Considerations," *Gerontologist,* Vol. 17, No. 6, 1977, pp. 486-491.

United Nations, *Determinants and Consequences of Population Trends,* Population Studies, Series A, No. 50, Vol. 1, Chapter VIII, "Sex and Age Structure," pp. 264-292, New York, 1973.

U.S. House of Representatives, *Consequences of Changing U.S. Population: Demographics of Aging,* Joint Hearings before the Select Committee on Population and the Select Committee on Aging, May 24, 1978, Vol. 1, Washington, D.C., 1978.

U.S. Public Health Service, National Institute on Aging and the National Heart, Lung, and Blood Institute, *Proceedings of the Second Conference on the Epidemiology of Aging, March 28-29, 1977,* edited by Suzanne G. Haynes and Manning Feinlieb, July 1980.

U.S. Public Health Service, National Institute of Child Health and Human Development, *Epidemiology of Aging,* edited by Adrian M. Ostfeld and Don C. Gibson, proceedings of a research conference on the Epidemiology of Aging, June 1972, esp. papers by Mervyn Susser, "Demography of Aging—Discussant's Perspective," pp. 83-96, Carl Eisdorfer, "Some Variables Relating to Human Longevity," pp. 97-105, and Leo G. Reeder, "Determinants and Correlates of Longevity—Discussant's Perspective," pp. 109-111.

Uhlenberg, Peter, and Mary Ann P. Myers, "Divorce and the Elderly," *Gerontologist,* Vol. 21, No. 3, June 1981.

Waldron, Ingrid, and Susan Johnston, "Why Do Women Live Longer Than Men," Part I, *Journal of Human Stress,* Vol. 2, No. 2, pp. 19-29, June 1976.

Walther, Robin Jane, "Economics and the Older Population," pp. 336-351, in Diana S. Woodruff and James E. Birren (eds.), *Aging: Scientific Perspectives and Social Issues,* D. Van Nostrand Co., New York, 1975.

Wiley, J.A., and T.C. Camacho, "Life Style and Future Health: Evidence From the Alameda County Study," *Preventive Medicine,* Vol. 9, pp. 1-21, 1980.

Wilkin, John C., "Recent Trends in the Mortality of the Aged," *Transactions of the Society of Actuaries,* Vol. 33, 1981, pp. 53-86.

Youmans, E. Grant, "The Rural Aged," pp. 81-90, in: Frank Clemente (ed.), *The New Rural America,* The Annals of the American Academy of Political and Social Science, Vol. 49, January 1977.

*U.S. GOVERNMENT PRINTING OFFICE : 1984 O-420-988/213